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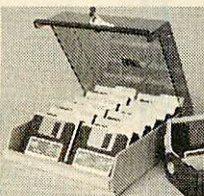
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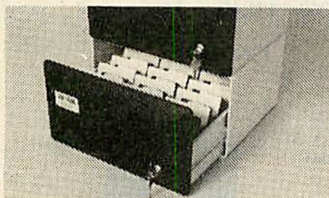
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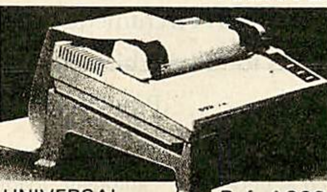
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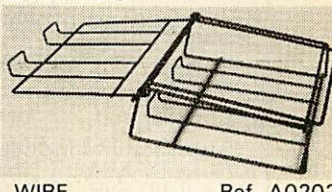
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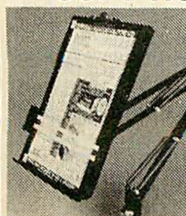
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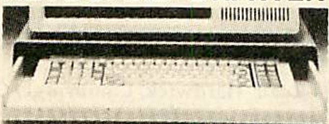
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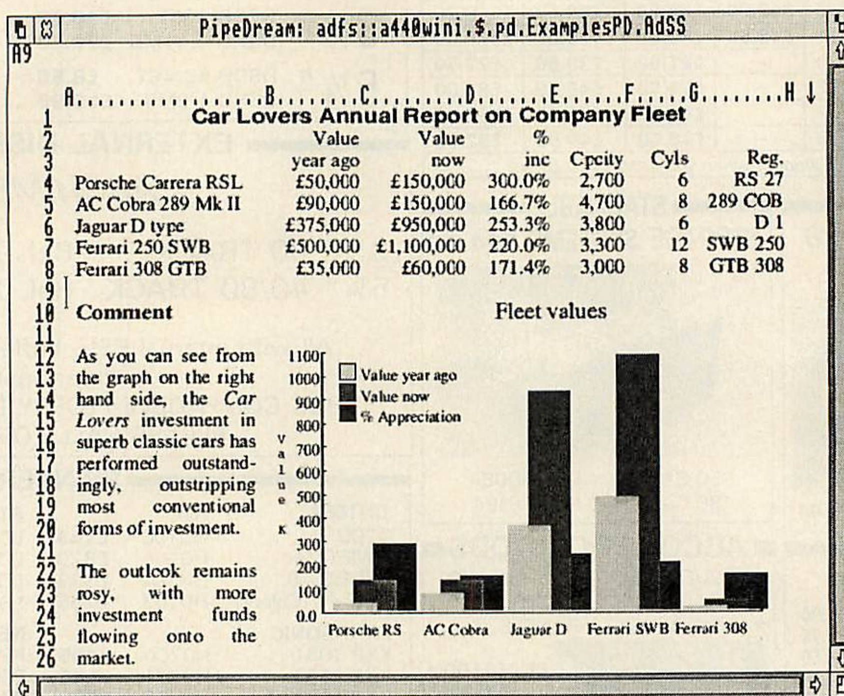
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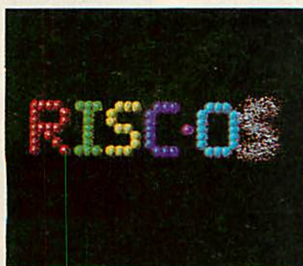
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64 GETTING THE EDGE



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30 RISC REVUE



120 TOP DRAWER

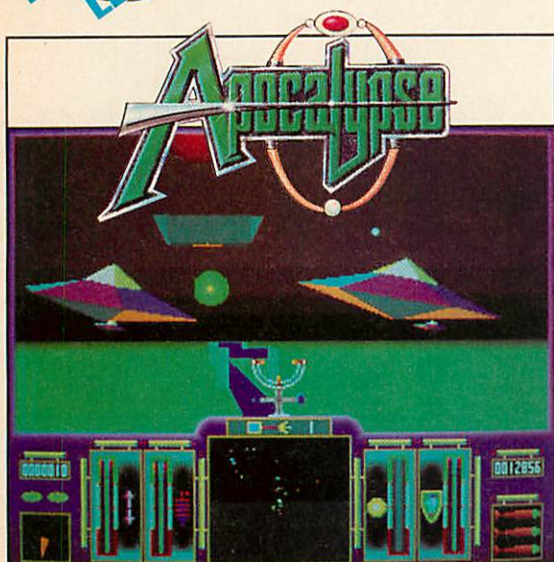


122 NEW GENERATION



A3000
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THE 4TH



APOCALYPSE

Apocalypse is designed purely for the Archimedes. Utilising the machine's colossal processing power combined with ingenious programming techniques, the author has created a masterpiece which could not have been produced on any other home computer. The author is of course Gordon Key who already has Holed Out and E-Type under his belt. Apocalypse is by far his best work to date.

The game places you on the surfaces of varied futuristic hostile planets colonised by ruthless enemies. With your highly advanced craft you must find your way around the planets and systematically annihilate the enemy. Your ship, which can fly or move along the ground, is extremely fast and can even fight whilst hurtling backwards.

The graphics are truly unbelievable. The solid, shaded 3 dimensional buildings and objects are animated more quickly and smoothly than ever before. If you shoot at them they explode in a way that is terrifyingly real often catching fire before bursting into a ball of flames accompanied by devastating sound effects.

Initially Apocalypse is easy enough for a beginner to enjoy but as you progress your foes will become increasingly hostile and you will discover fascinating new objects. These can have strange properties and many may need to be destroyed. It will be up to you to discover how.

The Royal Guild of Spacing will monitor your progress as you play. Your performance will be assessed at appropriate times and you will need to impress them if you are to continue your adventure. Apocalypse is an amazing game. There's only one way to describe it....

RAW EXCITEMENT.

PRICE: A3000/Archimedes £29.95


A3000/ARCHIMEDES


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INERTIA

Inertia is a totally original game with a huge landscape just waiting to be explored. It is available for the Archimedes, BBC Micro and Acorn Electron. Scattered (or rather fiendishly placed) around the landscape are many special tiles which need to be collected. Your highly sensitive craft floats freely around the landscape and you must exert forces upon it to guide its speed and direction.

You have a 3 dimensional viewpoint displaying a tiny fraction of the total playing area. There are walls, bridges, tunnels and ramps to negotiate and a host of mystery tiles with strange properties indeed. These include ice, jump and transformation tiles. There are even certain tiles which alternate the controls so that everything works in reverse.

This massive game has been very carefully put together and solving the puzzles within it will need lateral thought and a lot of dexterity.

The Archimedes version is considerably enhanced with digitised sound and music. It even features a full colour 3 dimensional map of the game which is a joy just to wander around. You'll certainly be amazed at the size of the game and the variety within it.

Inertia is a game for the determined. Each version makes full use of the ability of the computer so make sure you've got plenty of time to spare. Once you have started you won't be able to stop.

Electron User Golden Game May'90

*BBC Micro and Acorn Electron versions available **NOW**.*
Enhanced Archimedes version available in June, 1990.

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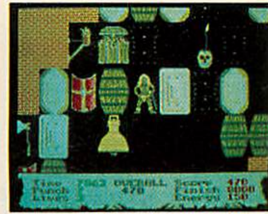
In the age when the castle was supreme it took dedicated warriors to overcome their defences, to loot and pillage, and finally to destroy.

You are armed with a mighty sword cast from the remains of a thunderbolt which fell from the sky many millennia ago. Also in your possession is a magic potion which makes you invincable to all for short periods of time. Armed with these you must penetrate the inner recesses of 4 castles and do battle with all you find in them.

As you progress you will discover many intriguing objects which can behave very strangely. Many are documented such as wooden panels, hour glasses, thorns, portculli, mirrors etc.. But most are

PRICE: A3000/


A3000/ARCHIMEDES


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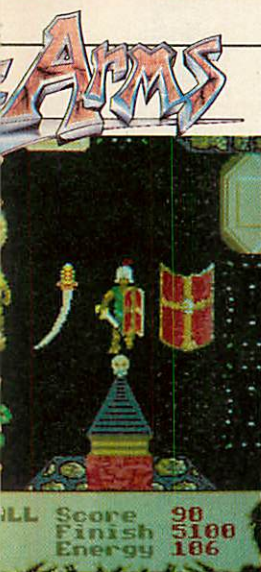
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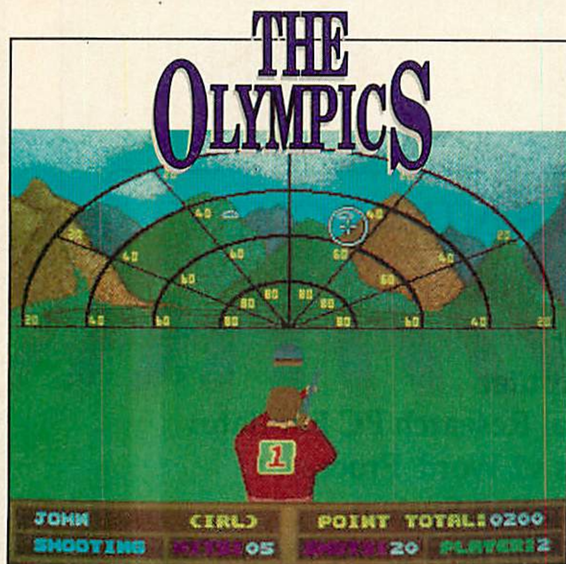
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A3000 ARCHIMEDES BBC B/MASTER ELECTRON







-ARMS

not. When you think your stuck, experiment and you'll discover properties you never knew existed.

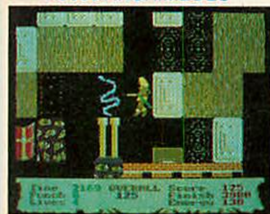
The subtle blend of arcade timing and adventurous puzzles make Man-At-Arms fiendishly addictive. You must plunder each of the 4 castles which become increasingly "puzzling" as you progress. Your overall objective is to kill all foes with your mighty sword and to plunder as much of the most valuable treasure as you can carry.

Man-At-Arms is a fascinating challenge with superb sound effects and music. No attention to detail has been spared and you can be sure of many late nights for weeks to come.

-himedes £19.95



A3000/ARCHIMEDES



A3000/ARCHIMEDES

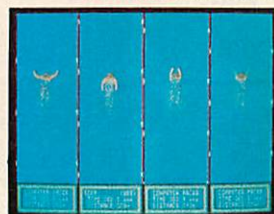
THE OLYMPICS

The Olympics is an experience which can be played by 1 to 8 players. It contains a superb piece of music, opening and closing ceremonies and 14 national anthems. When a player wins a gold medal the national anthem for his chosen country is played. Any World Records that you achieve can be saved to disc. With the click of a button all the relevant information concerning the record is automatically saved including your name, the exact time, day and date!

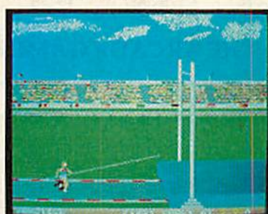
It is comprised of 6 main events: Diving, Shooting, Javelin, Swimming, Canoeing and Pole Vault. Some of these have several "sub-events" to choose from - there are 2 Shooting events, 12 Swimming events and 3 Canoeing events. These events have been chosen for maximum variety and enjoyment. They will "extract" all sorts of abilities: manual dexterity, timing, memory, perserverance, adaptability and above all guts!

The menu systems are controlled entirely with the mouse. As such they are extremely easy and quick to use. All events can be practiced or competed in individually, or altogether for maximum Gold, Silver and Bronze medals. You can also play all 6 events as a sort of "hex-athlon" where points are awarded for each event - the player with the greatest number of points is deemed to be the winner.

PRICE: A3000/Archimedes £19.95



A3000/ARCHIMEDES



A3000/ARCHIMEDES



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A3000/ARCHIMEDES

NEVRYON

This fast arcade game is disc based only and boasts 100K of graphics and game code for the BBC and 2 discs of over 1.5 megabytes for the Archimedes. It is a fast sideways scrolling shoot'em up which features 8 levels of furious opponents and very varied and very detailed graphics.

You fly a spaceship which can attain immense firepower - more lasers, a ram, gun droids and highly destructive missiles which are released from the top & bottom of your ship, then ignite and shoot forwards.

Whilst the BBC version is superb, the Archimedes version has been considerably enhanced and is truly exceptional putting many arcade games to shame. Nevryon uses the machine's raw power to full effect and gameplay is second to none.

It comes on 2 discs and features 5 true levels of parallax scrolling, more than 50 objects on screen, over 1 megabyte of 256 colour graphics, digitised stereo sound and music etc. etc.. You control a different ship on each of the 4 scenarios and there are a seemingly infinite number of weapons to collect and use. End of level monsters are beautifully animated but are anything but friendly.

BBC Review: "Graphics are very colourful and hectic, with explosions, missiles and aliens all heading for your ship. Together with a scrolling landscape, complete with stars moving in the background, they combine to form an enjoyable and action packed game." Micronet, Feb'90.

*BBC Micro version available **NOW**.*
Enhanced Archimedes version available in June, 1990.

PRICE:

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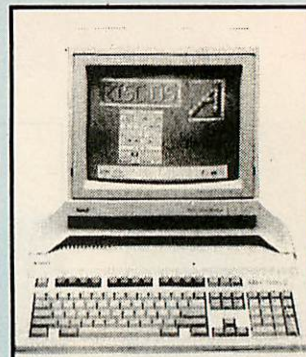
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THE LEARNING CURVE



THE LEARNING CURVE

NEW - FROM ACORN

It consists of:

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The new Digital Research PC Emulator
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Genesis Information System
A Video explaining how to use the package
Information on the National Curriculum

Save Over £185

The free software bundled with this package is worth £300, and yet the entire system costs only £115 more than the standard A3000.

Ideal For Home & Education

This system is tailor-made for the home user with children. The A3000 and other Archimedes systems are increasingly used in schools and this all-inclusive package with the excellent Genesis software will supplement Information Technology in the National Curriculum.

Just Right for Home & Business

A Word Processor is essential in all home systems, and 1st Word Plus with its built-in spelling checker is excellent. The new PC Emulator also means that over 95% of PC software (DBase, Lotus, Wordstar etc.) will run on the A3000 straight away.

RISC User

RISC User is the world's largest Archimedes Support Group, and publishes the leading magazine devoted exclusively to the A3000 and Archimedes. An annual subscription is £16.90 (UK) and carries a multitude of benefits, including FREE technical support and discounts.

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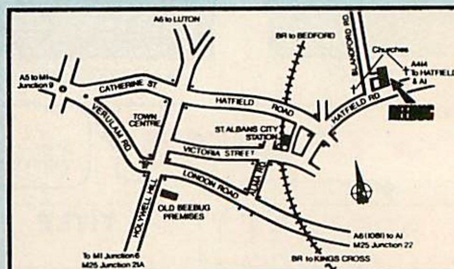
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Showroom is open until 8pm on Thursdays.



If you would like a leaflet on the Learning Curve Computer System write to:
BEEBUG Ltd 117 Hatfield Road, St Albans, Herts AL1 4JS. Phone: 0727 40303 FAX: 0727 60263

ATOMWIDE ENHANCERS

Orpington based Atomwide Ltd, has announced two upgrades designed to speed up the Archimedes.

At £34.50 the Atomwide VIDC enhancer speeds up the VIDC controller from 24MHz to 36MHz.

The unit provides an additional 18 high resolution colour screen modes in up to 16 colours.

These include 1024x640 with square pixels, and 1280x480 with mode 12 shaped pixels.

The upgrade works with any multisync monitor, and can be switched on or off via software control, or by switch.

Atomwide has also developed a £200 memory speedup system for 400/1 machines.

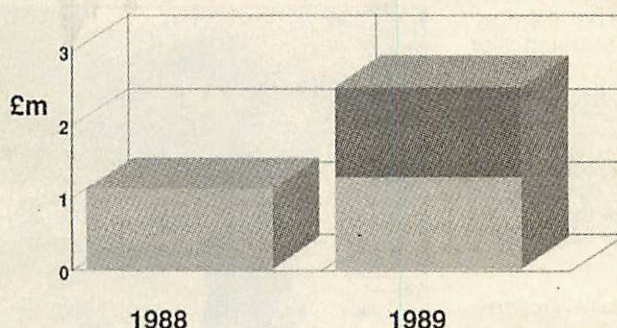
The system will speed up existing machines by 50 percent, and provide up to 48 percent speed increase on top of any machines fitted with an ARM3 upgrade.

The company has also released an 8Mb memory upgrade for £849.

The upgrade is supplied with software modules from Acorn which fixes some of the bugs in Risc OS that prevented its original release from working with 8Mb of memory.

Atomwide can be contacted on (0689) 38852.

FAIR YEAR FOR ACORN



Acorn Computer Group plc has built on the achievements of the first six months of 1989 with a 22 percent increase in turnover compared with the same period in 1988.

Turnover for the whole year was £44.9m, an increase of 15 percent for the whole year. More importantly, net income after taxation, and before the benefit of an exceptional credit of £1.2m, was up 16 percent.

Net income after taxation was £2.49m (1988 - £1.12m). In the 12 months ended 31st December 1989 the group achieved an operating profit of £2.52m (1988 - £1.13m) on a turnover of £44.9m (1988 - £39.2m).

However, the figure for 1989 includes an exceptional item, and without it (£1.2m) there's a drop of 20 percent compared with 1988.

Sam Wauchope, managing director of Acorn attributed the decline in profitability to pressure on margins, the costs of launching new products and expenses associated with the joint development with Olivetti. Commenting on the year, Wauchope said that the company had capitalized on its strength in the education market, and had achieved good sales in the home sector.

Acorn can be contacted on (0223) 245200.

ACORN REDUCES PRICES

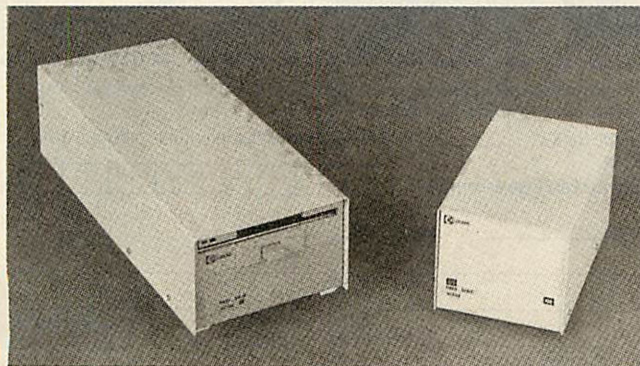
Acorn has reduced the price of the A3000 and Archimedes range in order to achieve further growth in 1990. The smallest reduction effects the BBC A3000 which now costs £599 ó a reduction of £50. The 410/1 falls by £100 from £1199 to £1099, and the top of the range A440/1 with 4Mb of Ram and a 50Mb hard disc is now £2099, a saving of £300. The Master 128 has been reduced by £40 and now costs £399. All prices are exclusive of VAT.

● The Learning Curve package represents a saving of £200, not £300 as reported in last month's news.

ACORN SIGNS NEW DISTRIBUTOR

Following the launch of The Learning Curve, Acorn has signed a distribution deal with distributor ZCL. The deal was made in order to increase Acorn's share of the consumer market. ZCL has over 1000 dealers across the country and has expertise in key target markets outside Acorn's traditional customer base.

REWRITEABLE OPTICAL DISC FOR THE ARC



Peripheral manufacturer, Cumana has released a range of mass storage devices for the Archimedes range, including an optical rewriteable disc drive. The devices are primarily intended for the educational market, and include disc interface units for converting Cumana BBC model B and 128 drives for use on the Archimedes, Winchester drives, and disc cartridge systems.

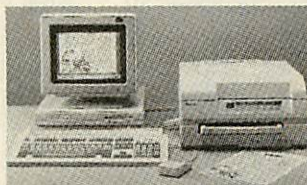
At £4255 the CAA 600RW magneto-optical rewriteable drive provides almost 600Mb of storage on one removable disc (£258.75), and has an access rate of 67ms with a transfer rate of 1.4Mb/sec at the SCSI interface. The unit uses ISO approved 5.25inch disc cartridges and incorporates a 256K memory buffer.

Cumana has prepared a factsheet on the new products, which is available by calling (0483) 503121.

DIRECT DRIVE LASER

Following hard on the heels of the Rand laser printer/podule, comes another from Computer Concepts.

Priced at £1148, the Laser Direct consists of a Qume Crystalprint engine and a podule which will work with all models of the Arc and the A3000.



The printer driver software supplied has been optimized to drive the card, and is completely compatible with applications that use Risc OS printer drivers. The software also uses the Acorn outline font system – so what you see is what you get.

The package is cheaper than buying a conventional laser printer, and can out perform most due to the processing power of the Arm chip.

Computer Concepts is on (0442) 63933.

FLYING HIGH

Printer manufacturer Star Micronics hopes to reach new heights – it is sponsoring an attempt to fly a hot-air balloon over Mount Everest.

The balloon will be piloted



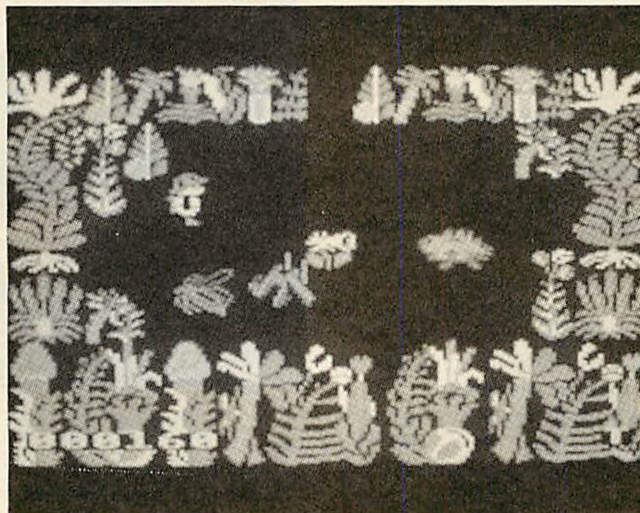
by Per Lindstrand who will be assisted by cameraman Leo Dickinson.

The attempt was due to have taken place last September, but was postponed due to the crisis in China. Another attempt, scheduled for April, has been thwarted by unsuitable weather.

Star now hopes the balloon will 'lift off' in the Autumn.

Star is on (0494) 471111.

ARC EMULATORS FROM ARXE SYSTEMS



Newly formed software house Arxe Systems has developed a number of emulators for the Archimedes range.

Arxe is using in-house development tools including Z80 and 68000 emulators to develop a number of products – including a Spectrum 48K emulator!

The company is currently negotiating with a well known games developer to bundle the Spectrum emulator with five games for around £20. According to Arxe's Onkar Jagpal, the emulator does not use the Spectrum Rom, and therefore cannot run Spectrum Basic. However, the Rom image can be loaded into Arc memory if a Rom/Ram board is used.

Arxe is currently developing a CP/M emulator, as well as others based around 68000 systems, but no releases are planned for the near future.

Currently available at £35 is *Multifs* which provides multiple filing system support from Risc OS to MS-Dos, Atari Dos and BBC DFS format discs. It also extends access to any Acorn PC-Emulator Winchester partitions.

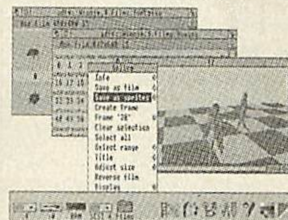
Also under development is an Arm 2/3 simulator and a C programmers' editor.

Arxe Systems can be contacted on 081-534 1198.

GET SPLICED

Ace Computing has released a film editing program which applies the skills of the cutting room to animated graphics.

At £30, *Splice* uses output



from Ace's film making software, *Mogul*, or can generate its own film from sprites created in an art package.

Features include the ability to delete and insert frames, join film sequences together shrink/enlarge the shape of a film and others.

Ace is on (0223) 322559.

PODULE NEWS

Morley Electronics has released an A3000 User Port/ADC expansion card at £9.

The minipodule fits into the internal podule slot and is fully compatible with the BBC model B's User Port and A to D converter in terms of Osbyte commands and the Basic ADVAL command. An IC connector for interfacing with other devices is also provided.

Morley Electronics is on 091-257 6355.

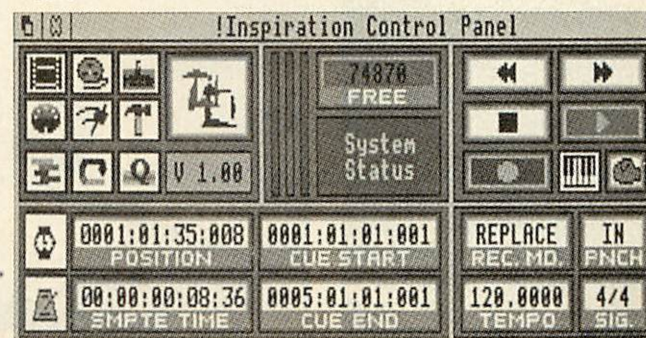
!INSPIRATION READY REAL SOON

The long-awaited MIDI sequencer for the Arc is still not ready despite it being promised for release last August.

Commenting on the delays, Pandora Technology's director Philip Brown said 'we are not prepared to release the product until we are happy with it. It has to meet high standards as required by recording studios.'

Brown refused to give a release date, but did say that *!Inspiration* was in 'the final stages of beta-testing.' He attributed some of the delay to getting the package to run under Risc OS.

Meanwhile, Pandora will supply a demo disc free of charge on receipt of an SAE and 3.5inch disc. Pandora is on 071-221 9653.



NEWS IN BRIEF

● Storm Software is adding to its educational software with Archimedes and A3000 versions of its titles.

Ollie Octopus', Sketchpad and Amazing Ollie have additional features, and are aimed at kids from four years up. Storm is on (0963) 22469.

● Voltmace has launched a yoke joystick for the BBC model B.

At £29.95, the Deltabase B has been mainly designed for use with flight simulators, and features two fire buttons. The normal joystick up/down movement has been replaced with a sliding in and out action. A small toggle switch on the front switches the unit to reduced sensitivity. Voltmace is on (0462) 894410.

● Pinboard Computers Ltd., has developed a mouse port splitter box for the A3000 and Archimedes computers.

The unit saves having to lift up the A3000 to change between mouse and Delta-Cat joystick. It costs £19.95, and is available from Pinboard at Unit 9, Bondor Business Centre, London Road, Baldock, Herts SG7 64P.

DIARY DATES

9-10 June. All Formats Computer Fair, New Horticultural Hall, Victoria, London. Contact John Riding (0225) 447453.

9-11 July. Acorn Networks 90 – the fifth annual computer networking conference, Keele University, Staffordshire. Contact Sarah Scott on (0223) 245200.

20-22 July. British Music Fair, Olympia, London. Contact Westland Associates on 071-730 7852. Music software.

7-9 September. BBC Acorn User Show, Westminster Exhibition Centre, London. Contact Safesell on (0737) 814084.

25-28 September. Business Computing 90, Earls Court, London. Contact Montbuild on 071-486 1951.

DTP CONTEST WINNER



After sifting through thousands of entries to our DTP competition, *BAU* is pleased to announce that Jason Patrick from Bishop's Stortford, Hertfordshire is the winner.

Jason has won a complete DTP system comprising of a BBC A3000 with colour monitor, Acorn DTP software and a Panasonic KX-P4450R laser printer. In order to win, readers had to answer 12 questions which were set over three issues. The questions were set around printing from the early days to present times, and in order, the answers are:

Johann Gutenberg invented the printing press. The first proper book to be printed was a copy of a 1282 Bible in Latin. Lewis Edson Waterman invented the fountain pen (in 1884). The *New York Herald Tribune* was the first newspaper to use a Linotype typesetting machine. 1978 was the year in which the first electronic typewriters were sold (by Olivetti and Casio). An adobe (this was the tricky one) is a sun-dried brick.

The laser was invented in 1958, and is an acronym for Light Amplification by Stimulated Emission of Radiation. And Hewlett Packard take the credit for producing the first personal laser printer.

Postscript and Hewlett Packard PCL are the two most common laser printer control standards, and a 'pica em' is 12 points, or about 1/6 inch. Finally, The Acorn *DTP* software was derived from *Timeworks DTP* by GST.

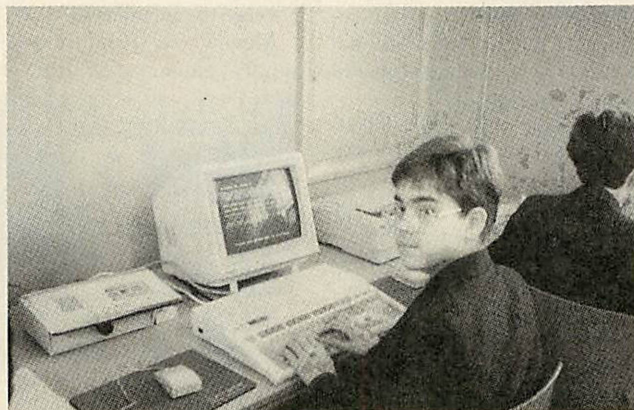
IT LAB OPENED

St. Martin's Prep School in Northwood, Middlesex is ready for the National Curriculum with the recent opening of an Archimedes based IT lab.

Twelve BBC A3000s, plus a number of BBC model B, and Master 128's are currently being used in the lab and throughout the school for applications including graphics, DTP and wordprocessing.

Music is being taught via the use of keyboards and a MIDI interface, and in September the school will be going 'on-line' with a modem and comms software as part of the students studies in programming and computer theory.

The school intends to use and develop subject-specific software for every school department, and is currently playing a leading part in developing a spreadsheet.



JUNIOR STORIES FOR THE ARC

Sherston Software has launched two enhanced versions of its junior educational adventures for the A3000 and Archimedes.

The Worst Witch and *Stig of the Dump* have been re-written to take advantage of the machines. Both adventures are based on children's books, and are designed to encourage thorough and careful reading.

Sherston is on (0666) 840048.



WRONG NUMBER

Apologies to Microvitec for printing an incorrect telephone number in the April news story about the company's Cub 3000 monitor. Its correct number is (0274) 390011.

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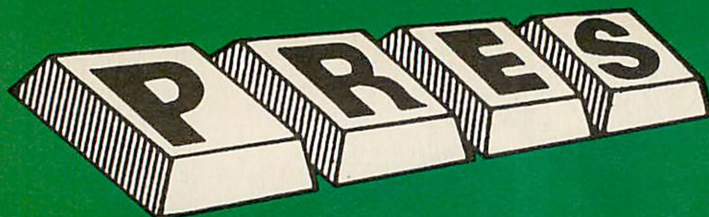
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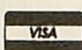
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PINEAPPLE SOFTWARE

The Pineapple Software Real Time Colour Video Digitiser

What is a Real Time Video Digitiser? There are quite a few different 'Digitisers' available for the Archimedes but very few can accurately claim to fit the above description. The requirements are that it must be able to 'grab' a single field of video information from a colour moving source, such as a video recorder, TV, or video camera, and then process the image and display it on the computer screen.

The Pineapple Digitiser does just this, – and at a price which is less than some Digitisers which can only handle static images.

HARDWARE

The hardware consists of a double podule which fits inside a 300 or 400 series Archimedes, and comprises a PAL colour decoder, 256K memory and various control and interface circuitry. The PAL decoder converts the input signal from your TV or video recorder into separate red, green and blue signals. These are then converted digital form and stored in the 256K ran in a format giving 512 pixels across the picture and 256 rows vertically. The video signal in the ram is constantly changing at the same rate as the incoming video picture until the podule receives a signal from the computer to 'freeze'. At this point the last picture in the ram is frozen and can be transferred to the computer screen in many different ways depending on which software commands are issued.

SOFTWARE

The software to drive the podule is supplied on disc in the form of a relocatable module. This provides a host of additional '*' commands and SWI's which can be used even by inexperienced progråmmers to produce very impressive displays of live pictures or ones previously saved on disc. For non-programmers, ready written programs are provided to explore all the features of the Digitiser and produce 'Sprite' images which can be used in many other applications and 'Art' packages. The software is very easy to use and scaling routines are provided which allow you to manipulate the grabbed image by selecting any part of the picture (using a box drawn on screen controlled by the mouse) and placing it on any area of the screen, again using a box to select the position and size. This enables multi-picture images to be produced very rapidly using either live pictures or ones you have previously saved on disc. The 80 page handbook provides full details of how to implement the commands even for the inexperienced programmer.

EDUCATION

The Digitiser has many uses in education. The software commands can show many of the effects typical of the digital storage of TV pictures which can help to explain the way in which TV works. It can also be used to produce powerful audio-visual displays tailored to your own requirements from images captured using video cameras etc. For younger children, programs can be created to help learning by giving high quality visual images of animals, birds, trees etc, built into a 'quiz' format. The possibilities here are endless.

FUN & GAMES

As well as showing off to all your friends who don't have an Archimedes, what a great computer it is, you can use the Digitiser to produce images for all sorts of games and visual demonstrations. Games such as 'Guess the Celebrity' or 'Guess the Advert' can be produced by even inexperienced programmers, simply by 'grabbing' all the necessary images from TV and saving to disc.

SPECIFICATION

Video Inputs	Pal coded video, .75 Volts – 2·5 Volts pk to pk R, G, B & sync input All inputs may be terminated by internal DIP switches.
Resolution	512 x 256 pixels
Storage system	Standard version 4 bits Red, 4 bits Green, 4 bits Blue – 192KRam Extended version 5 bits Red, 6 bits Green, 5 bits Blue – 256K Ram
Picture Area	The Digitiser harware allows the full screen area normally viewed to be stored in the podule ram. Horizontal shift, Vertical shift and width can be adjusted internally if required.
PAL Decoder	The PAL decoder provides manual control on Brightness, Contrast and Saturation, combined with full auto saturation control.

QUESTIONS & ANSWERS

Q – What is the difference between the 12 bit and 16 bit version?

A – The 12 bit version can produce very high quality pictures, those shown on this page were produced that way, but 16 bits can give even better results particularly in high resolution screen modes.

Q – Why have an R, G, B input?

A – For those who have professional video camerass capable of producing R, G, B outputs, the R, G, B inputs can give significantly better results than the PAL inputs by avoiding the coding-decoding process. This removes some of the defects of the PAL system such as cross-colour, and also reduces noi5'

Q – Is a moving picture available?

A – Yes, you can show a real live moving TV picture on the computer screen. This means that if you are using a video camera or recorder as an input source then you don't need a separate monitor to frame up the picture.

Q –Will it work on the A3000?

A – Yes, but you need an external 12volt power supply and a box to mount the podule in. Some manufacturers already provide suitablle add-on boxes, and we will shortly be providing our own low cost verison.

Q –Are the controls difficult to set up?

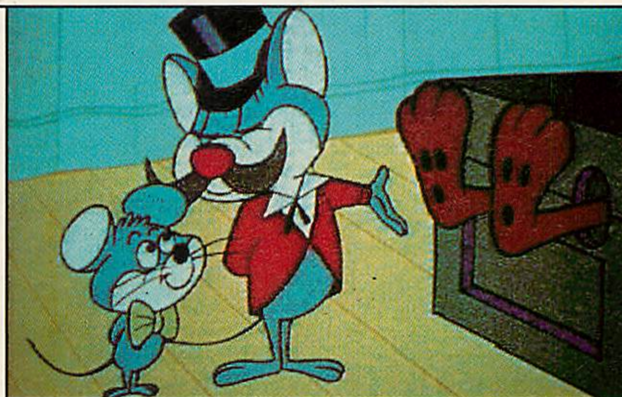
A –No, the three controls are exactly the same as on a normal TV set, Brightness, Contrast and Colour (Saturation). They may appear difficult to get at as they are at the back of the computer, but once set to your preference the brightness and colour should not require further adjustment, and the contrast (which is the easiest to get at) will only need adjusting if the video input source is changed.

Q –Does it take a long time to Digitise a full screen colour image?

A –Not really, a full screen image takes just 6 seconds on a standard 310, and reduced size images take proportionately shorter times.

Q –What software commands are built into the module?

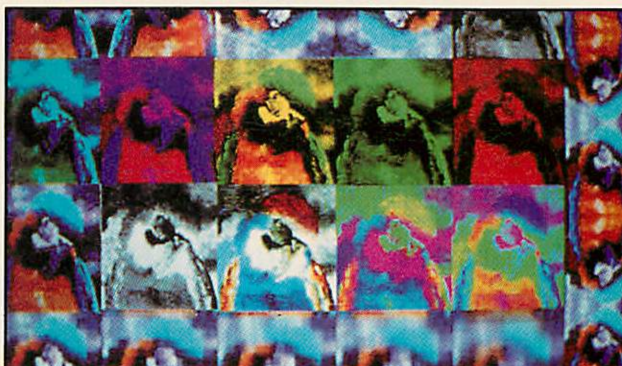
A –The software is under continual development and updates will be made available under our usual updating schemes (i.e) most updates are free), but the currently available commands are :– Average, Bits, Default, Digitise, Flip, Focus, Freeze, Image, Loadscreen, Loadsprite, Loadvideo, Mono, Moving, Negative, Noise, Outline, Palette, Primary, Restorescreen, SaveAIM, Savescreen, Savesprite, Savevideo, Screenarea, Setvideo, Unfreeze, Videoarea.



The Pineapple Colour Digitiser



A Multi Picture Image



A Full Screen Picture

– 'Pineapple has produced one of the 'ultimate' Computer Video Digitisers' –

– 'The Pinapple Colour Digitiser looks to be one of the most professional products yet to seen on tghe Archimedes' –

Acorn User – April 90

Prices

Standard £285.00

Extended £315.00

POSTAGE AND PACKING FREE

BBC PCB Designer

This ever popular Rom based PCB designer is suitable for all BBC micros. It's fast high density 1:1 scale print routine allows prototype boards to be made directly from a printout, and a 2:1 scale print may also be used to produce professional quality boards. A second Eprom is optionally available to add a powerful auto-track routing facility to the program. This utilises a 'rats-nest' input rountine and allows any component to be 'picked up' and moved around the board without having to re-specify component interconnection.

The full auto-route facilities are available even on a standard unexpanded model 'B'.

'PCB Autoroute is remarkable. No similar software comes near the price.'
ACORN USER Aug 88

PRICE	Manual track routing	£85.00
	Auto track routing	£185.00
	Plotter Driver	£35.00
		P&P Free

Still available at new discounted price! DIAGRAM II £25.00 !!!

ADFS Utilities Rom

ADU is an invaluable utility for all ADFS users. It adds over 22 new * commands to the ADFS filing system as well as providing an extensive menu facility with over 35 sub commands covering such areas as repearted disc compaction, saving and loading Rom images, auto booting of files, and many more. Transferring of files from DFS to ADFS is also made very easy.

ADU ....£29.00 P&P free

ADFS Utilities Rom

RB2/101	Bare for BBC	£49.83
RB2/101+	With software	£54.83
RB2/115	Archimedes	£49.83
RB2/107	Atari ST	£49.83
RB2/109	Amiga	£49.83
RB2/110	Nimbus	£49.83
RB2/306	IBM PC/XT/AT	£99.66

Mousetrak adapter to enable 101 and 101+ to work with Mouse software £8.00

Archimedes adapter to enable 101, 101+ to work with Archimedes £19.95

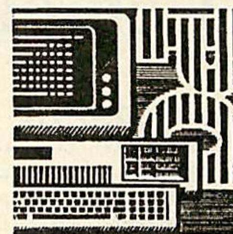
Postage & Packing on Tracker Balls..........£1.75



Please Add 15% VAT to all prices

39 Brownlea Gardens, Seven Kings, Ilford, Essex IG3 9NL Tel: 01-599 1476

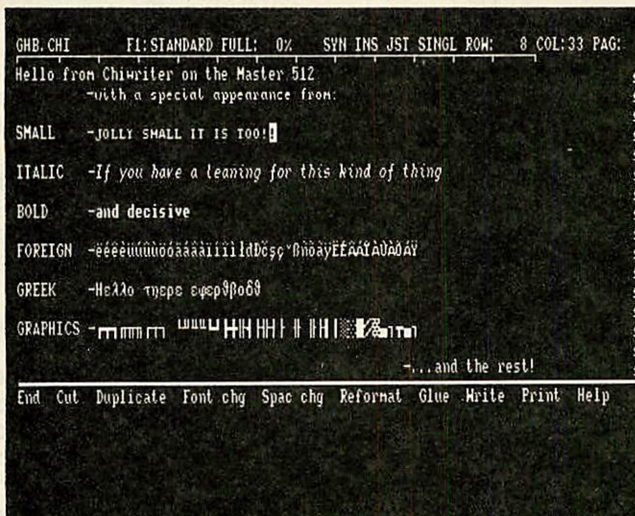




A CLASH OF SYMBOLS

A lot of wordprocessors can't cope with complicated equations or special symbols and more than one learned scholar has had to fall back on leaving blank spaces that are filled in by hand later.

The result can be a tacky finish to an otherwise professional piece of writing. Enter *ChiWriter* from Horstmann Software Design – an easy to use and inexpensive wysiwyg package that works wonderfully well on the Master 512 and on the Archimedes with the PC emulator.



You will find that ChiWriter will be able to handle most of the wordprocessing tasks you need

Using *ChiWriter* is very easy indeed. You type away in the default font (which is Standard English) until the need arises for a special character. This is produced with the function keys. Pressing f9 once, for example, will produce the 'Math 1' set in which mathematical symbols are instantly available on just the next keypress.

In this mode, after pressing one key you automatically return to Standard English. Pressing f9 twice will keep the math font active until you press another function key. Pressing Alt-H (COPY-H on the 512) will bring up a display chart that tells you which key encodes which symbol. Whatever font you choose the selected character appears on the screen – essential when editing equations and formulas.

The first four fonts (f1 – f4) are alphanumeric, containing regular letters and numbers, and are called Standard, Small, Italic and Bold. Small, for example, is used for super- and subscripts. Another four fonts (Shift-f1 – Shift f4) are also alphanumeric: Underline, Orator, Script and Gothic.

F5 is called Foreign and is quite essential for foreign language wordprocessing. It won't produce Chinese characters and there is no phonetic alphabet but everything you need for European languages is here. f6 is a special Symbols font, f7 is Greek, f8 holds line drawing symbols and the last two, f9 and f10, are for mathematics.

Engineering symbols are not included but you can use *ChiWriter's* Font Designer to make up your own. A chemistry font can be purchased separately and tables and diagrams can be quickly drawn.

Don't forget, this is a wordprocessor. All standard wordprocessing functions are available and easy to use. Files from *WordPerfect* and *Wordstar* can be imported but not *Multimate* or *Microsoft Word*.

Ease of use is the main attraction of *ChiWriter*. There are other scientific wordprocessors to choose from but none are as friendly as this. The command line for functions other than choice of font appears across the bottom of the screen and a line below carries a brief description of each. Moreover, should you wish, this part of the screen can be wiped clean and provide more lines of text on-screen. Call it up again when the need arises.

Chiwriter needs 256K of Ram. Supported printers include Epson 9-pin dot matrix. You will need to pay extra for 24-pin printer drivers (but the supported IBM graphics Proprinter will drive an LQ-800 so it's worth experimenting), and HP LaserJet drivers. EGA and VGA screen support is also extra.

ChiWriter is not, however, the only scientific word-processor on the market.

Volkswriter Scientific will cost you a lot more and it will take you a lot longer to use all its facilities but I'm not convinced that it does much more than *ChiWriter*. Engineering and chemical symbols are included, however, so it will attract some people.

The chief reason for mentioning it is that it allows an opportunity to demonstrate the worth of Shibumi's *Problem Solver*. Try running *Volkswriter* on the Master 512 after loading Dos+ and you'll get a horrible selection of digits and characters on the screen forming the fatal message:

```
Break Point Error from VS....
Program Terminated
```

If, however, you load *Problem Solver* after Dos+, turn SHIFT LOCK on and type <PS> RETURN and then call up *Volkswriter* you will find that it runs perfectly. No such problem crops up, of course, with the PC emulator and the Archimedes.

ORDERING SOFTWARE

When considering the purchase of PC software there are a couple of points which you should bear in mind.

Most of the software is going to come from the USA anyway, so it's worth checking prices and availability with a US firm such as Express Technology.

This delivery firm offers a fast air delivery to your door in less than a week after receiving your telephone order charged to Visa, Mastercard, Access or American Express. (Alternatively, you can write to 7850 East Evans, Suite 103, Scottsdale, Arizona, 85260).

The phone call is free. You just ring 0800 89 1073 (9 am – 12 midnight British time) or use the 24 hour fax 010 1-602-998-8913. Prices generally compare very favourably with UK figures.

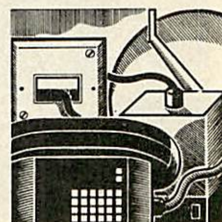
To the best of my knowledge this company is very reliable and when I've dealt with it in the past I've been impressed by its efficiency. However, it's always worth a call to PC distributors in England to check on availability and cost. You can try RSC at (0923) 243301 or ISC at (0480) 300530.

Whoever you order from remember to state the size of disc you need. This will depend on whether you're using the Master 512 or PC emulator on the Archimedes.

But even if you are using the Archimedes, you might want the larger size discs for their compatibility with PC machines.

Chiwriter is available directly from Horstman Software Design Corporation, PO Box 5039, San Jose, CA 95150, USA. Tel: 408-298 0828. It costs $79.95 plus $10 (£6.50) postage to Europe. *Volkswriter Scientific* is available from most PC dealers.

Problem Solver may be purchased from R Prof Camara Sinval, 138 Porto 4100, Portugal, for £25.



A PILE OF TRASH

Micronet has launched a new multi-user game called *Trash* on Prestel. The game puts you in the role of a pan-dimensional dustman, ridding the Multiverse of rubbish while you penetrate its mysteries and weird humour.

The multiverse is a collection of interlinked dimensions presided over by 'Da Boss', a strange being of almost unlimited power. Pollution in the multiverse is rife, and in order to preserve it, you and fellow players must collect up the rubbish and trash and destroy it in the Atomic incinerator.

There are many puzzles to be solved and places to explore. As you trash rubbish you gain credits which can be spent in a number of ways.

If all this sounds confusing, fear not. A multi-player game is just that, a game which can be played by many people at the same time interacting with each other. What you see on screen changes in 'real' time, showing you where you are,



what is happening, and what other people are doing in your vicinity.

The game can be played in viewdata or scrolling modes, and a database with info on *Trash*, together with a chatline and suggestion box is also provided. For more information key *TRASH# when next on Prestel.



Pictured above is the interior of a poll tax collection vehicle. Straight up. Some enterprising security firm has developed these mobile units which are crammed with on-board computer and telecommunications equipment as well as two specially trained drivers/cashiers. BAU understands that the inner-city model comes with a parachute batallion and a turret mounted ED-209 which screams 'Poll-tax collection, you have 15 seconds to comply.'

DYNAMIC FLUTTER

Casino is a collection of dynamic videotex games available on Micronet. The game originated from Australia and is very popular among users of Viatel, the Australian equivalent of the UK's Prestel.

Casino, which was developed by a company called The Games Machine is available on Micronet on a trial basis. It simulates the games found in an Australian casino – with none of the risks or losses.

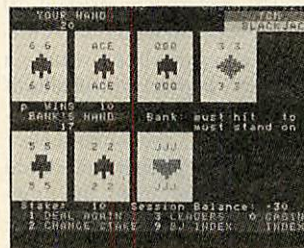
Games provided include *Roulette*, *Blackjack*, *Chuckdice*, *Two Up*, *Keno*, *Fara*, *Baccarat*, *Poker* and the slot machines. Of course there are differences between *Casino* and a conventional casino.

First, you are not playing for real money, but you do have unlimited funds. As *Casino* is



accessed via a Gateway, it is multi-player and you find yourself competing against all the other casino players on the basis of who can accumulate the most winnings on each individual table, and for the casino as a whole.

As well as playing the tables you can observe the fluctuating fortunes of players on instantly



updated leader and winner boards at table and casino level. You can also view your own and other player's individual profit and loss records which are updated instantly for the current month and year.

So, what's it like? Brilliant! The dynamic graphics (animation) are excellent, and there is a real competitive spirit among fellow players. To access The Games Machine enter *CASINO# when next on Prestel.

David Janda

NEWS IN BRIEF

A new BB aimed initially at professional carers, voluntary workers, charities and church groups has opened up in Reading.

Running on a viewdata host called Caretel 90 which is based on the Communitel system it runs on a BBC Master and 20Mb hard disc.

Caretel 90 is available 24 hours a day on (0734) 568536.

● My thanks go to the Hayfield Deaf Unit which is based in Glasgow. After I featured Project Notify in the April issue they emailed informing me that the only way for deaf people to contact each other is to use the XCH or BKU network on Telecom Gold.

It goes to show that comms can help.

● A letter from Jason Robson of Beyond Belief (0642) 787898 informs me that the system has undergone some changes.

Three years ago it started life on a model B with dual drives. The board is now run on an Archimedes 310 with a 30Mb hard disc unit.

As well as providing a wide variety of files for the Arc and Beeb, the system also includes files for the Hybrid Music 500/0.

Software and hardware reviews, plus weather satellite pictures for the Arc are also in the pipeline.

● For a while, the future of Oracle hung in the balance. All is well now as David Mellor, Broadcasting Minister, has decided to support the continuation of a national commercial teletext system.

If you have any comms news please send it to David Janda at BBC Acorn User *or contact him on Telecom Gold 81:RED001 or via Prestel 919992492.*

The latest news and views from the Acorn educational world



NEWS IN BRIEF

● Widgit Software has released *From Pictures To Words*, a set of nine language and literacy activities for primary pupils or people with special educational needs.

The program enables teachers to create activities using pictures and words selected from an unlimited vocabulary. These can range from word matching and spelling to story writing using both words and pictures.

It comes with a library of 300 pictures and there are plans for the release of additional libraries. Also included is a drawing package which teachers can use to produce their own pictures.

Currently available for the Beeb and Master, an Arc version will be published later this year.

From Pictures To Words costs £25 from Widgit Software, 1 The Ryde, Hatfield, Herts AL9 5DQ. Educational establishments can obtain copies on 14 days approval.

● The *City Disc* is a set of two interactive video packages, each containing two LaserVision Rom videodiscs.

The first reveals the Cultural City, its historical, geographical, archaelogical and architectural features.

The second explores the Financial City, the processes and terminology of its business, institutions and role within the world economy.

Both videodiscs use the LV-Rom system, developed for the Domesday discs, which allows analogue video frames, sound and digital data to be stored on the same disc, so schools need the BBC AIV system to run them.

The packages come with comprehensive user guides.

Simnett is the sole distributor of the *City Disc*. It can be contacted at 15 St George's Industrial Estate, Richmond Road, Kingston upon Thames, Surrey KT2 5BQ.

ENDURING FAVOURITES

Educational publisher Sherston Software is frequently in the news and the company has now launched Archimedes and BBC A3000 versions of two of its popular junior packages.

The *Worst Witch* and *Stig of the Dump*, based on the children's stories by Jill Murphy and Clive King, have both been re-written to take advantage of the power of the new machines.

The programs have been designed to encourage thorough reading as, in order to succeed in the adventures, children must read the books very carefully.

Author Marshal Anderson says, 'We found it easier to embellish the illustrations with additional detail that can change as the story goes along, while the greater speed and capacity of the new machines means the adventures can handle more text faster. Especially in *The Worst Witch* there is much additional text which creates a more realistic adventuring environment.'

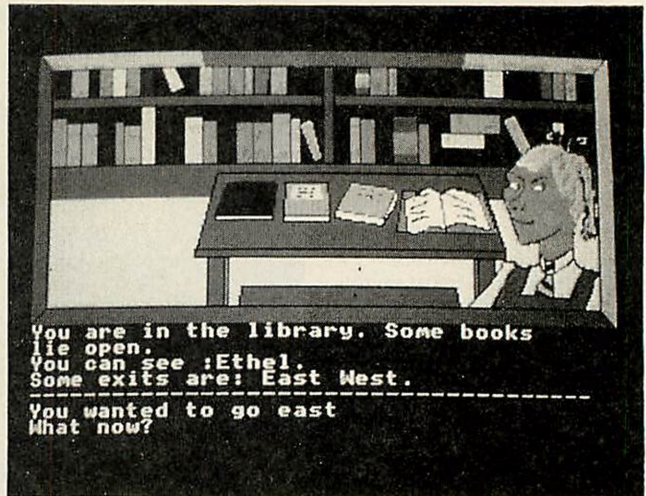
Sherston has also launched a series of supplementary materials to be used with its packages to support the National Curriculum for maths and English.

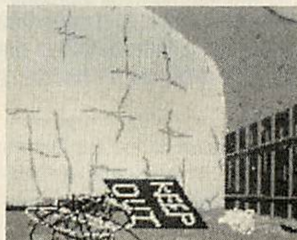
The materials consist of 10 photocopy masters for children's worksheets and a teacher's booklet with details of attainment targets covered by the programs and worksheets.

So far Sherston has produced packs to accompany the programs *The Fleet Street Phantonm*, *Space Mission Mada*, *Stig of the Dump* and *Wizard's Revenge/Return*. Each costs £4.95.

Sherston also produces flowcharts for several of its packages showing how they fit into the National Curriculum for science. These are available for *Wizard's Revenge*, *Wizard's Return*, *Animal Rescue*, *Space Mission Mada*, *Stig of the Dump*, *The Farm*, *Nature Park Adventure*, *Teddy Bear's Picnic* and *Microbugs*.

The flowcharts are free and teachers wanting copies should send a stamped addressed envelope to Sherston Software, Swan Barton, Sherston, Malmesbury, Wiltshire SN16 0LH.





You can now use your Arc or A3000 to play adventures based on the classic children's books The Worst Witch (top) and Stig of the Dump but both programs take pains to promote a close reading of the text first.

JOURNEY WITH MAPS

Durham IT advisers Dave Maddocks and Lesley Lincoln have written *Information Technology: A Curriculum Map*, a document for secondary schools.

The booklet looks at how IT fits into the National Curriculum, with an emphasis on cross-curricular IT capability. Each area and level is coded to indicate which school subjects it could be covered in.

According to Maddocks and Lincoln, 'It is essential for a school to examine its existing curriculum and the requirements of the National Curriculum and then undergo some form of curriculum mapping to integrate the two. This requires a whole school approach and cannot be done by the IT co-ordinator acting in isolation or within a small group. This booklet should be considered as an initial discussion document to start the process within a school.'

Individual copies of *Information Technology: A Curriculum Map* cost £9.99 but LEAs can purchase an original set of laser-printed masters for £50.

TWO STRAND RESEARCH

The Open University and Hatfield Polytechnic are to get £100,000 from the Leverhulme Trust to fund research into the use of IT in primary schools.

Previous work at the poly has found that information on computer is often little help to children in solving problems.

OU research has found that children working in groups do better than those working alone.

The Leverhulme project is designed to bring these two lines of investigation together. It hopes to identify what it is about collaboration that helps students succeed. The findings will be used to devise ways that computers can supply information appropriate to children's needs.

Lisa Hughes

16 bit SCSI



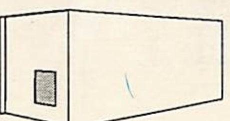
Oak's high speed 16 bit SCSI podule offers a new level of performance for the entire Archimedes range (including the A3000) with data transfer rates of up to 1.4Mb per second, a considerable increase over both ST506 and 8 bit SCSI controllers. Up to 2 Gigabytes of winchester storage may be fitted per machine, and seven SCSI devices including 4 winchesters may be attached to the card.



The card provides a new filing system 'SCSIFS', and an icon and filer for the Risc OS desktop. It can work in tandem with ADFS winchesters, and is compatible with the PC emulator. Low level (SWI) support is provided for other SCSI devices (e.g. tape streamers, CD ROMS etc.)

Internal winchester kits are supplied as 'plug in and go' units, with all necessary cabling and mounting hardware, and external drives are supplied in sturdy metal cases, colour matched to the Archimedes, and have their own power supply and fan. External drives are also suitable for the A3000.

A comprehensive manual with easy to follow fitting instructions is provided with each system, along with a versatile formatting and utility program. Oak SCSI drives may be write protected for security.

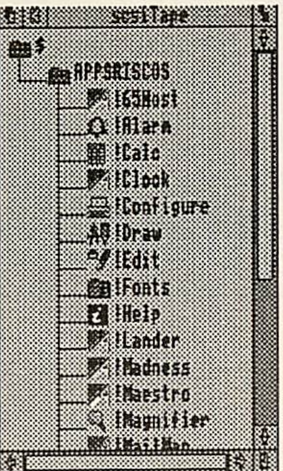


All Oak SCSI winchester drives are subjected to rigorous quality control procedures, and each drive comes with its own test certificate.

Internal Drives (inc. SCSI card)		**External Drives** (inc. SCSI card)	
20Mb (HDINARC20SC)	£375.00	20Mb (HDEXARC20SC)	£535.00
45Mb (HDINARC45SC)	£495.00	45Mb (HDEXARC45SC)	£655.00
80Mb (HDINARC80SC)	£795.00	80Mb (HDEXARC80SC)	£955.00
100Mb (HDINARC100SC)	£1114.00	100Mb (HDEXARC100SC)	£1274.00
200Mb (HDINARC200SC)	£1458.00	200Mb (HDEXARC200SC)	£1618.00
SCSI Card (SCSIARC)	£199.00	300Mb (HDEXARC300SC)	£2845.00
SCSI Card (SCSI3000)	£199.00	512Mb (HDEXARC512SC)	£4085.00
P&P internal drives/card	£10.00	P&P external drives	£15.00

16 bit SCSI Controller Card and High Speed Winchester Drives

Tape Backup



Oak SCSI tape streamers, available in 60Mb and 150Mb capacities are the ideal means of backing up large amounts of data. Using 'DC600' type data cartridges and high quality tape drive units, Oak tape streamers provide a reliable insurance against data loss. Multi-tasking, window software allows information to be backed up from any Archimedes filing system. Restoring data from tape is simple. A tree viewer of the directory structure stored on the tape, or a 'filer' type display can be shown in a window, and then the files to be restored can be simply 'dragged' with the mouse to the destination filing system, or even into an application!

Unattended backups may be triggered on a regular basis using the inbuilt automatic backup facility. Prompts to prevent accidental overwriting of existing files may be given during a restore as required.



Note: An Oak SCSI controller card is required. Drives are supplied with 1 free tape cartridge.

Tape Streamers	
60Mb without SCSI card (TS60SCA)	£999.95
60 Mb with SCSI card (TS60SC)	£1099.95
150Mb without SCSI card (TS150SCA)	£1254.00
150Mb with SCSI card (TS150SC)	£1354.00
P&P on Tape Streamers	£15.00
60Mb Tape Cartridge	£24.95
150Mb Tape Cartridge	£27.95
P&P on Tape Cartridges	£0.75

SCSI Tape Streamer

New Products

Gigabyte Tape Streamer

For those requiring vast amounts of storage for archiving of data, the new Oak Gigabyte Tape Streamers offer the ideal solution. Storing 1 Gb of data on a single Digital Audio Tape cassette, these SCSI devices provide exceptionally reliable bulk data storage with low media cost. The tapes are accessed using our Risc OS Tape Backup software described in the Tape Backup column. Front panel controls and an LCD display allow access to facilities such as tape formatting etc. which may be performed off-line i.e. without tying up the computer.

1Gb Tape Drive (TSGIGA)	£3999 (p&p £15)
1Gb Cassette (TAPE1000)	£35 (p&p £0.75)

Magneto-Optical Drive

The very latest technology in mass storage. Oak Magneto-Optical drives store 560Mb of data on 5.25" optical media. The drives are random access devices and behave as winchesters under the SCSI filing system. Data may be written, read and erased at will. The data cartridges are removable, looking similar to compact discs, and are extremely rugged. They are double sided with 280Mb of storage per surface.

Magneto-Optical Drive (MAGOPT560)	£4800 (p&p £15)
Data Cartridge (MAGOPTDISC)	£300 (p&p £0.75)

A3000 Monitor Bridge

A sturdy unit which bridges the A3000 whilst still allowing access to the mains switch, disc drive and reset button. The bridge is of steel construction and is finished in a robust powder coat paint finish coloured to match the A3000.

Monitor Bridge (MSB01)	£19.85 (p&p £3)

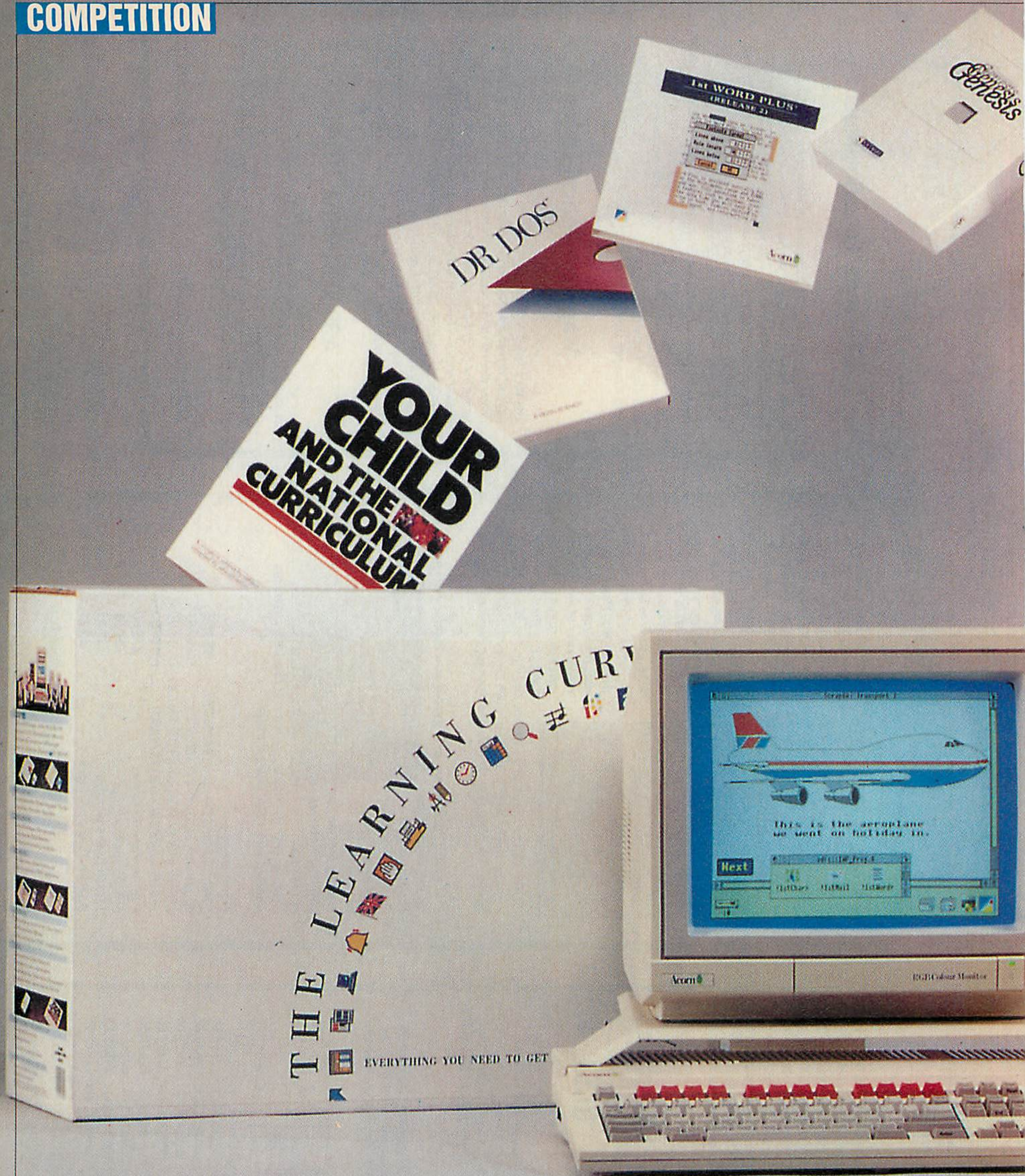


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All prices exclude VAT.


1st WORD PLUS
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YOUR CHILD AND THE NATIONAL CURRICULUM
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This is the aeroplane
we went on holiday in.
Next
Acorn
RGB Colour Monitor

A WINNING P

BBC Acorn User, in conjunction with Acorn Computers brings you the chance to win the latest and greatest Acorn home computing package.

With both hardware and software included, The Learning Curve is the ultimate in home learning. Enter this simple competition and you and your family could have one in your own living room.

The Learning Curve system comprises the 1Mb BBC A3000 micro complete with Acorn colour monitor, monitor stand and the Risc OS operating system and applications packages – *!Draw*, *!Paint* and *!Edit*. However, the package does not end there. There's also a selection of the best software and information, in itself worth £200.

- *Genesis* is the very latest in hypermedia – a new buzzword in education. Developed by Software Solutions, *Genesis* will provide hours of learning and entertainment. See the review on page 122 of this issue.
- No computer has anything to write home about unless it has a wordprocessor. The Learning Curve offers the latest version of the first ever wordprocessor for the Archimedes – *First Word Plus*. With all the benefits of Risc OS, *First Word Plus* version 2 makes the written word a pleasure to compose.
- The PC has certainly changed the work environment. Indeed it has made a considerable impact on educaton too. To use PC software on your new BBC A3000, the Acorn PC Emulator and DR Dos (with manual) is included in the Learning Curve.
- *Your child and the National Curriculum.* Exactly what is your child expected to learn at school? Acorn and *The Observer* get together to compile this essential guide to what the National Curriculum means to the education of your children.
- Since not everyone is a computer whizzkid, The Learning Curve includes a tutorial video so the family can learn about their new machine and discover exactly what the software can do. It's an invaluable aid to those new to computers.

To make sure you don't miss this once-in-a-lifetime opportunity, all you have to do is match up the list below of famous fictional characters with the schools they attended. To make things a little harder, there are two extra 'red herring schools' in the list.

On the back of a postcard or sealed envelope write the names of the seven characters and alongside each write the name of the corresponding school. Don't forget to include your name and address and a daytime telephone number and then send in your entry to:

Learning Curve Competition
BBC Acorn User
Redwood Publishing
20-26 Brunswick Place
London N1 6DJ

Your entry should arrive no later than 11th June 1990. The first correct entry from the Editor's bounteous hat will receive the coveted prize.

This competition is not open to employees of Acorn Computers or Redwood Publishing or their families. The decision of the judges is final and no correspondence will be entered into.

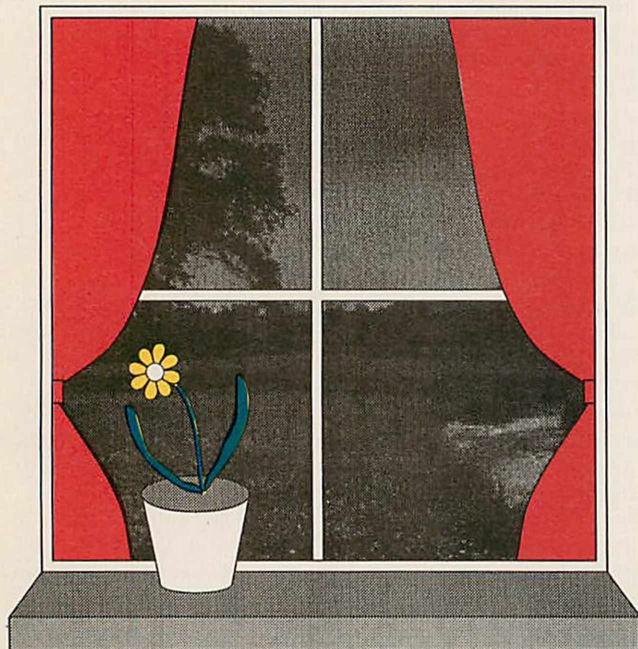
CHARACTERS	SCHOOLS
Nicolas Nickelby	Greyfriars
Jennings	Rugby
Billy Bunter	Grange Hill
Pug	Mill Hill School
Tom Brown	Dotheboys Hall
Tucker Jenkins	Bash Street
Molesworth	Linbury Court School
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	St Custards

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PC EMULATOR

ACKAGE

NEXT MONTH Coming soon to BAU...

WINDOW SHOPPING



If you've ever gazed lovingly at the windowing capabilities of the Archimedes then the July issue of *BBC Acorn User* will go some way towards alleviating the envy for Master owners.

Next month in *BBC Acorn User* there's a full-feature windows program which provides multiple active windows in many styles with sideways Ram storage of the overwritten screen.

The ultimate artificial intelligence programs are those which alter the way they work to produce the right results. The July *BAU* introduces the subject of such 'genetic algorithms' with a full working example.

Plus, there's a complete sideways Rom program giving you nine extra star commands for printing characters on the screen of your Beeb or Master in bold, light, rotated, reversed and so forth.

The July issue of *BBC Acorn User* also sees a special extra section for diehard Beeb and Master owners. So as not to desert the long-standing readers of *BAU*, we present a hints and tips special.

And, of course, the July issue is brimming with reviews of all the latest on the Acorn scene – the latest video digitiser for the Arc from Wild Vision, *Instigator* from Dabs, *Metafont* from Tools, and *Chaos* from Longman.

Not forgetting all the regulars – Risc Review, 8-bits, the Comms, Music and Education columns, News, Letters and End User – which go to make *BBC Acorn User* the best reading, best value and best selling mag for Acorn aficionados.

DON'T MISS THE JULY ISSUE – OUT 14th JUNE

Send letters to BAU, 20-26 Brunswick Place, London N1 6DJ



STAR STRUCK

Can you please tell me where I could obtain a program on disc (BBC B) on the subject of astrology? I am interested in the subject and wish to learn more about it, including the casting of horoscopes.

B Taylor
Wiltshire

A number of astronomy programs have appeared in recent years for the Beeb although astrology is still relatively uncharted territory. We would be pleased to hear from anyone who has delved into the stars, and pass on any relevant info to Mrs Taylor.

TERMINAL TASKS

At present I am using my BBC Master 128 to access remote databases. I intend upgrading to a BBC A3000 and want to extend this access to include graphic materials and to access a graphics terminal such as the Tektronic 40XX series.

Can you recommend some suitable software which will enable me to use my new computer for this task?

C Larksworth
Cheshire

The Beebugsoft *Hearsay* package for the BBC A3000 and Archimedes series provides an emulation of the Tektronic terminal. This is an emulation of the Tektronic 4010 graphics terminal with 4014 conventions. Alpha, graph and point plot modes are supported as well as incremental plot and GIN modes. Sketch and screen dump facilities are also supported.

NO COMMODORES HERE

Our school uses BBC Masters and BBC A3000s. A parent has recently offered us a Commodore 4022 printer and a Commodore 40/40 dual floppy disc drive. We are wondering whether it will be possible to use either of them with our present BBC computers?

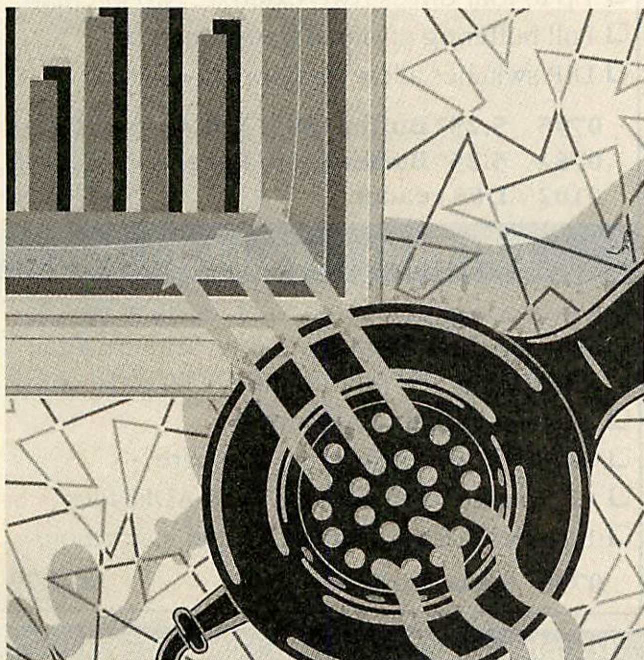
H Barnes-Cook
Avon

Basically the answer is no, although with a lot of hard work you may achieve limited success. It would be considerably cheaper to buy a new or secondhand disc drive and printer.

The printer does not interface with either of the ports normally used for printers (Centronics or RS232) on the BBC micro series and so you would need to purchase a rather specialist IEEE interface to link your Commodore printer to the BBC Master.

It may be technically possible to link the Commodore drive to the BBC series but it would be difficult. The Commodore drive uses a serial interface and has a very slow data exchange rate.

As you know, the BBC has a specialised disc interface and a dedicated port for the disc drive. To use the disc drive you would have to carry out some hardware modifications to the drive to enable it to use the disc drive port or you would have to build a specialised interface to use the drive through the serial port.



REVIEWER'S BLUES

I have just been reading the glowing review of *Pipedream 3* by Dave Futcher in April's issue. It makes me wonder whether the review is from the manual, or from hands on experience. Do not get me wrong, it is a great piece of software, but after a frustrating few weeks with it, it is not perfect.

The ReadMe file in the examples has to be read in order to realise that the manual is wrong with regard to the multifile option, and although the ReadMe file does advise using the updated Risc OS printer drivers, it doesn't really warn you that the ones supplied by Acorn will not work with multi file-documents (only printing the last file).

Being a *View Professional* user, it came as a shock to find that the sorting with *Pipedream* was apparently much improved, only to find that one of my favourite sorts with *VP* was no longer possible with *Pipedream 3* (where slots contain numbers and slot references). The computer hangs up its hourglass with 37% and there it stays.

I cannot get rid of the Z88 icon except by resetting the computer, and I cannot get a window to the front, as described in the manual. Petty irritations, but after paying out £169 surely simple things that could be corrected. It is a fine piece of software, but an actual piece of reviewing as opposed to simple description would have been better.



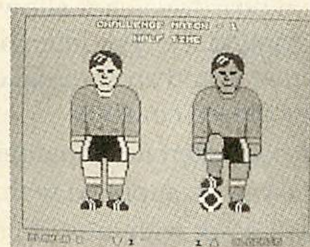
Incidentally, Mr Futcher mentions it may be possible to load Draw files – he should try it, it does work – see the Draw demo file from the Applications suite (above).

Peter Barlow
Co Durham

WOT NO GAMES?

I have been reading *BAU* for five years now, and find the overall content to be interesting and varied, with one exception. Games coverage has always been limited with only a few pages at most devoted to this popular and enjoyable area of home computing.

In recent years, things have worsened, with the abolition of your high-score tables and introduction of a single 'Games Page'. One page out of about 140 is surely not enough. I would say that there has been sustained interest in games both by the public, and by your rival magazines but not by your good selves.



Is there any good reason for this or have you decided to concentrate on other areas?

Tarquin Fintim
Loosh

Games coverage in *BAU* is admittedly limited, but surely it is quality, not quantity that counts?



SOFTWARE Bargains AND Mercury Games

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PROBLEMS A selection of problems from our Post A Problem service



QUESTIONS AND ANSWERS

Q I have a BBC Master 512 and would like to program in Cobol. Are there any versions of this language available for my machine?

A A PC version of the Cobol programming language is published by Utah in the USA, but I have not seen it available in the UK.

Grey Matter at 4 Prigg Meadow, Ashburton, Devon TQ13 7DF specialises in computer languages and would be a good company to contact. Unlike most PC software suppliers, it has heard of the BBC Master 512 and will be aware of the need for the language to operate under Dos-Plus and not MS Dos.

Q I have just upgraded from a BBC model B to an A3000. I have a number of programs that I wrote for my own applications in BBC Basic. Some of them relied heavily on the BBC's function keys. I find to my dismay that my A3000 does not have a function key f0. What can I do?

A You are quite correct – there is no f0 key on the A3000. You should use the PRINT key instead. The older BBC uses keys f0 to f9 while the A3000 has keys f1 to f10.

Q I have a BBC A3000 and I am having problems with the use of my printer which is a Mannesmann Tally MT80+ with Computer Concepts' *Impression* package.

A Unfortunately, the Risc OS printer drivers for dot matrix printers are expecting printers compatible with later Epson printer standards.

These are the FX standard for 9-pin dot matrix and the LQ standard for 24-pin dot matrix printers. Your Mannesmann Tally MT80+ is compatible with an earlier Epson MX standard which is not supported by either the FX or LQ standard.

This all means, as unfortunately you have discovered, that your printer cannot cope with or manage to print in the graphics or text mode that the Risc OS drivers can.

I'm afraid the power of the A3000 and the DTP power of *Impression* does need a more powerful printer than you have at present.

Q I recently bought a secondhand BBC micro, and I'm totally confused about using the disc drives to load programs.

The person I bought the machine from suggested I press SHIFT and BREAK together to load programs. But that does not seem to work on all the discs I have.

A By pressing SHIFT and BREAK together you will only be able to load programs on discs that have a !Boot file present.

Check the discs that won't boot by typing *CAT <RETURN> or *. <RETURN>. You can then look to see if the disc has a !Boot file.

If not you can load programs written in Basic by typing CHAIN "NAME", where name in quotes is the program's title, which you can find in the disc's catalogue. Programs written in machine code are usually run by *RUN NAME, but this time the name is not put in quotes.

Sometimes the program can be run by just placing a * in front of the name.

Can I suggest you contact the National Centre for Information Technology in Manchester and purchase a copy of *Disk-drive Projects for Micros* by Michael Milan. This is a BBC-specific book and will be of value to you in getting to grips with using disc drives.

Q I want to use my BBC Master 128 for comms work. I have managed to pick up a secondhand Magic Modem and now I want to get some software to run things so that I can access Viewdata and Bulletin Boards.

A Luckily there is a very good range of comms software for the BBC series of computers. Among the best are:

CommSoft from Softmachinery, 68 Botley Road, Oxford OX2 0BU

Command from Beebug Ltd, Holywell Hill, St Albans, AL1 1EX and

Commstar II from Pace at Juniper Way, Allerton Road, Bradford BD15 7AG.

If you are having problems with an Acorn micro, commercial software or a program you are trying to write then *BBC Acorn User* can help. The Post A Problem service guarantees to give you a personal answer within 10 working days for just £4.

Write out your problem with as much detail as possible and, if a program is involved, include a disc or cassette. Fill in the coupon at the bottom of this page and send it and your problem along with a cheque or postal order for £4 (including VAT) made out to Redwood Publishing. If you want recorded delivery add on the cost of this.

Please note that debugging readers' own programs or those from other magazines is a complex task and we cannot guarantee to give a full solution. Unless the problem can be spotted quickly, the Post A Problem service will only be able to make general comments. The service will answer the problem and return all material received within 10 working days of receipt. If we fail to match this promise then your cheque or postal order will be returned – you can't lose!

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Q I have recently purchased a Sony colour TV (model KV-P14U) which I want to use as a monitor with my BBC micro. It has a Scart connector, can I use this?

A You should have no real problem using the Sony Scart connector to connect to the BBC's RGB socket on the back of the BBC micro.

You should be able to get a ready-made lead from Microsnips at 37 Seaview Road, Wallasey, Merseyside L45 4QN.

Q When I was bargain hunting at a computer auction recently, I picked up a Microline U83A printer which unfortunately did not have any manual with it.

I have managed to get the basic features to work, but have got nowhere with things like subscript or superscript.

Have you any idea where I might get a manual so that I can get all the features of this printer working?

A The Microline range of printers are produced by a company called Oki, which had Japanese origins although I know it has a large base in the USA. Oki printers were quite popular in the UK in the early 1980s.

Oki's UK distributor is Technitron Data, 750 Deal Avenue, Slough Trading Estate, Slough, Berks. It should hopefully be able to provide you with some documentation or give you an address in the USA which will.

Q I'm looking for a simple database to use for filing simple data concerning the membership of my local tennis club. A colleague said that as a beginner I would find Acornsoft's *Viewstore* too difficult. What program would you recommend?

A It would be useful if you read 'Set Store by your Beeb' which appeared in the February issue of *BBC Acorn User*. This article looked at all the BBC database packages. A really simple and easy to use database that would be ideal for the membership type of records you want to hold in store with your micro would be *Masterfile II* from Beebugsoft. I think you will find it far easier to use than *Viewstore* and it should cover most of your needs.

Q Can I use my BBC A3000 for the presentation of business graphics? I used to use *Interchart* on my BBC micro very effectively. Is there something like this available?

A You can get a version of *Interchart* to run on the BBC A3000 under the 6502 Emulator.

But you would be better served with a Risc OS compatible program.

Two come to mind. These are *Presenter 2* from Lingenuity, Wood Farm, Linstead, Magna, Halesworth, Suffolk and *Graphbox* from Minerva Systems, 69 Sidwell Street, Exeter, EX4 6PH.

Q My BBC-based system has the *Interword* Rom installed. I think it is a great wordprocessor but it does not allow me to include a range of foreign language words and exotic symbols in my wordprocessing output that I occasionally need.

***Wordpower* from Ian Copestake Software seems to offer everything that I require, but learning a new word-processor seems to be a real chore! I really would like to carry on with *Interword*. Have you any suggestions? Would a solution be to program the printer's characters myself?**

A There is no need to resort to programming your printer's characters yourself, or to change wordprocessors to enable you to obtain the sort of printout you want from *Interword*. I am sure that you can use *The Publisher* Rom from Permanent Memory Systems.

This package has a range of fonts which include modern European languages, Greek and Latin. They also have some fonts that include a range of symbols.

ACORN CUSTOMER HOTLINE

A number of people want to know how to change the default printer driver when starting *First Word Plus*. This can be achieved on both release 1 and 2 of *First Word Plus* using the following methods.

Release 1 – In the directory $.resources.1wp of the *First Word Plus* program disc there is a file called 1wp_print which is the default printer driver that is loaded every time you start the package. This file should firstly be renamed to 1wp_print2 so that it can be retrieved if required at a later date. In the directory $.1wp.cfg of the *First Word Plus* utility disc you will find the variety of printer drivers that are supplied as standard. The appropriate driver for your printer should be copied into the $.resources.1wp of the *First Word Plus* program and can be renamed to 1wp_print. This will then load every time you start the wordprocessor.

Release 2 – This is similar to release 1 in that the original 1wp_print should be renamed and the appropriate driver copied from the utility disc to the program and renamed to 1wp_print. The directory structure of the release 2 package is different to release 1 and the appropriate files can be found in the following directories.

The default printer driver is on the program disc in the directory $.!1stWord+ (this directory is entered by holding down SHIFT while double clicking on the directory).

The printer driver can be found on the utility disc in the directory $.1wp_print.config.

- It is possible to purchase upgraded software for use with the Midi expansion card for the Archimedes, A3000 and the I/O Podule that has Midi fitted. The upgrade provides extra functionality within the software and is also required to run Pandora's *Inspiration* software. Upgrades can be obtained from any Acorn dealer under these stock codes.

AKA 54 – for A3000 User Port/MIDI upgrade(AKA12) Rec. Retail price £11.50.

AKA 55 – for Archimedes MIDI expansion card (AKA16) Rec. Retail price £17.25.

AKA 56 – for Archimedes MIDI addon to I/O Podule (AKA15) Retail price £13.80.

These prices exclude fitting.

- The amount of telesoftware on SID is continually increasing. We now have all the Archive Careware and Shareware discs available for downloading by registered users.
- Further to the information in the April issue on the Acorn Font Packs. Acorn has now released an extended version of the Selwyn (Zapf Dingbats) font and includes the Sidney (Symbol) font. The Selwyn Font contains a full set of 202 symbols; it can replace the subset of 96 characters provided with the Acorn *Desktop Publisher* package. The Newhall Font pack contains three fonts in addition to those supplied with the Acorn *Desktop Publisher* package. These are Newhall Medium, Newhall Bold Italic and Newhall Medium Italic. All the Font Packs include full information on how to update both the DTPconfig file for use with Acorn *Desktop Publisher* and the PSprolog file for use with the Acorn Risc OS *!PrinterPS* application for driving Postscript printers.
- When copying files between directories under Risc OS with the default copy options you must delete any file with the same filename as the files that are being copied into that directory. It is, however, possible to set the copy options so a file will be overwritten. The copy options should be set as follows:

```
*Set Copy$Options A ~C ~D
F ~L N ~P Q R ~S ~T ~V
```

For details on copy options type:

```
*HELP COPY.
```

 For all Archimedes and A3000 owners, DAVID ACTON has compiled his

RISC REVUE

£20 DOTS BEFORE THE EYES

Our opener this month is a spectacular little graphics demo from Reuben Wells of Cambridge. Inspired by Michael Attenborough's explosions in January's *BAU*, Reuben has come up with an 'implosion' routine.

Listing 1 on the yellow pages does the business. For the purposes of demonstration, Reuben used the Risc OS sprite from the file *PaintDemo* which comes on one of the Risc OS application discs. You will need this file to hand. Alternatively, listing 2 will create a sample sprite file that can be used instead. Just run listing 1 and watch the letters of the message whizz on from all directions.

PROCsetup selects mode 13 and initialises variables and so on. Note that two screen banks are used, so you will need to have at least 160K of screen memory configured. The variable maxdots% is the number of flying pixels that can be animated and should be increased if the object you are 'imploding' is particularly large. PROCsetup also initialises the table used in the explosion routine. Each pixel that will 'fly' has a 20 byte entry in the table and the first eight bytes are set to random velocities.

The two WHILE loops and the function FNisblank near the start of listing 1 have been cobbled on to Reuben's original program so that the PaintDemo sprite can be used without modification.

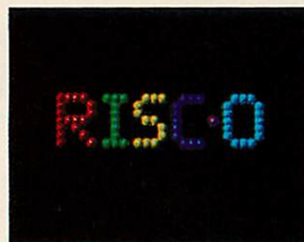
The main work is done by FNscan_screen (which looks at a section of screen and breaks it down into a set of individual pixels) and PROCexplode (which animates the scanned area).

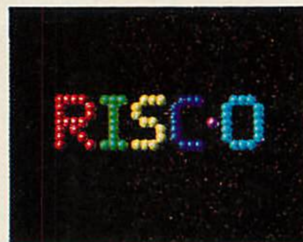
FNscan_screen takes five parameters: the co-ordinates of the screen area to be scanned and the number of stages in the final animation. These are passed to the routine .readscreen which initialises the data for each dot, multiplying the randomly chosen velocities by the number of stages to find the starting co-ordinates. .readscreen returns in R0 the number of dots found, which is then returned by FNscan_screen.

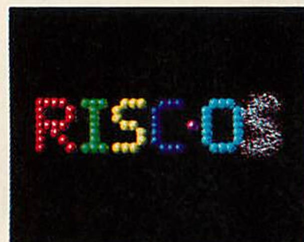
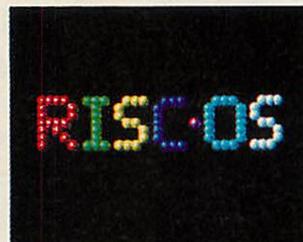
PROCexplode performs the animation, taking as parameters x and y offsets for plotting and the number of dots to move. The routine .animate is called the appropriate number of times and the dots fly in.

For ease, the dots are EORed onto the screen so they can be plotted and unplotted by the same code. The routine .initialplot displays them in the first instance and both this and .animate invoke .draw_it to do the plotting. Note the screen start address is read legally by .read_screen using SWI 'OS_ReadVduVariables'. .alter_table simply moves a dot on to its next position.

Reuben's routines can easily be adapted to provide a nice front end to a program or maybe a superior Game Over type message. See what you can come up with. Obviously you'll need to choose the appropriate co-ordinates for PROCexplode and FNscan_screen. You will also need to set the value of nullcol appropriately (in PROCsetup). This is the 'background' colour of the sprite being exploded and pixels of this colour will be ignored. Setting nullcol to 256 will cause pixels of all colours to be included in the effect.





Watch 'Risc OS' implode with this wacky routine

£20 SHOOTING STARS

Remember the Colliding Galaxies feature by Andrew Rankin back in the July 1989 issue of *BAU*? Well, it caught the eye of many readers, including Ray Porter of Lancing in West Sussex. Ray has provided us with some amendments to the original making it run almost 100 percent faster on the Archimedes. Ray gets £20 for this dramatic improvement.

To try out the changes, load the original program and then type in the lines of listing 3 on the yellow pages. Be sure you get the line numbers right. Then save the program.

The improvement in performance comes in using speedy Basic V features, particularly those in the area of array handling. Much of the effort of the original program lay in a FOR...NEXT loop from lines 900-1020. Ray's version consists of a much shorter loop and several single array operations which do the work of a loop.

Another change that Ray has made is cosmetic. Now, two screen banks are used and the display is switched between them so that the progress of the galaxies from frame to frame is 'clean'. This is done with our old OS_Byte friends – 112 and 113. Other 'archifications' include the replacement of several IFs with the neater CASE statement. Basic V graphics commands such as POINT and CIRCLE FILL are used to shorten and speed up the program.

For those new to Basic V, it is worth mentioning just what operations are available on arrays. Simple arithmetic works in all cases where the dimensions of the arrays are the same. This is what makes such a difference to the Colliding Galaxies program. If a(), b() and c() are all single-dimension arrays with 100 elements, the command:

```
1000 a()=b()*c()
```

can be used instead of:

```
1000 FOR i%=0 TO 99 1010
a(i%)=b(i%)*c(i%) 1020 NEXT
```

and is much quicker. Constants can be used too (so a()=a()+42 will add 42 to each element). The most sophisticated array operator is . which is used to do a matrix multiply, as in:

```
a()=b().c() .
```

Although this is only implemented in part, it is still a substantial time-saver and was used in the 3-D graphics demo in Arc Agora back in June 1988's *Acorn User*. Them were the days them were...

BACK TO BASICS

With the arrival of the A3000 more people than ever are switching to Basic V from the earlier versions on the BBC and Master machines. Many write in asking about features of the new Basic and how programs might be upgraded from Beeb to Arc or, indeed, converted the other way round where possible. Over the next few months I'm going to devote a section of Risc Revue to Basic V – highlighting some of its better features and, I hope, showing new users how they might make their programs shorter and faster.

I'll start with some of the graphics commands of Basic V. These are probably the commands new users try first and are all quite self-explanatory. Many are just friendly versions of old PLOT commands. CIRCLE replaces the old PLOT 149. To draw a circle at (x,y) with radius r simply use: CIRCLE x,y,r. RECTANGLE x1,y1,x2,y2 draws a rectangle with the two corners (x1,y1) and (x2,y2) – much simpler than the old MOVE and four DRAWs. Filled shapes are created by including FILL immediately after the command, as in CIRCLE FILL 640,512,100.

Ellipses are much easier to draw using ELLIPSE x,y,r1,r2,ang. The centre is at (x,y) and the 'radius' in each direction r1 and r2. The optional angle ang should be in radians. If specified, the ellipse is rotated.

The old way of plotting a point (PLOT 69,x,y) is shortened to POINT x,y and flood fills are performed with FILL x,y. Incidentally, relative rather than absolute co-ordinates can be used in DRAWing and MOVEing by sticking BY after the command: DRAW BY 100, 100 for instance.

The old GCOL command has been improved slightly. Before, to select a colour for 'normal' plotting required the command GCOL 0, col. Now, this can be shortened to GCOL col although the first parameter can still be introduced for fancy plotting (using EOR and so on).

FROM TOKYO TO KYOTO

You know the TV ad. The chap's chewing his biro frustratedly, peering at his bar charts. Then, stopping only momentarily to check the time in Tokyo on his unmentionable brand of hardware, strikes a deal with his oriental friend and tosses his aforementioned writing implement triumphantly to the strains of a well known song.

Now you too can be the darling of the international markets. Well, at least you can check the time in Tokyo. Just hold your pen in tossing readiness and, with your remaining fingers, tap in listing 4.

The program shows the current time and date in eight major cities of the world. Well, our researchers tell us they're major cities, but personally I think the heat got to them in Jamberoo.

As for the gory details of the program, it's quite simple. The time is read using OS_Word with R0=14 and R1 pointing to a block of memory.

On entry the first word of this block contains 3; on exit the first five bytes contain the time. This is actually rather awkward, since Basic likes to deal with four byte integers.

Hence the small piece of assembly language earlier on. This is simply used in adding or subtracting time differences to London time.

The cities and their time differences (in hours) are stored at the end in DATA statements, so you can easily replace Jamberoo with Rome if you feel it's strictly necessary.

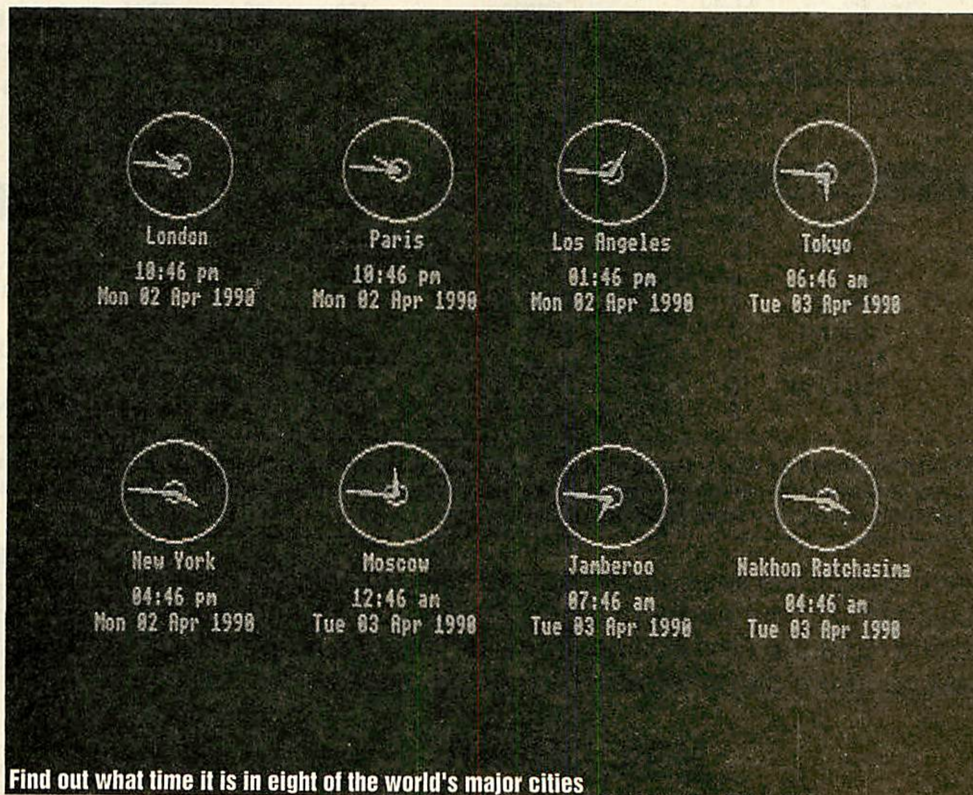
The displaying of the time and date is done using SYS 'OS_ConvertDateAndTime'. This takes four parameters: our adjusted time (stored at time2), a buffer, the buffer's length and a 'format' string. This last string determines how the time or date is to be returned. There are almost endless possibilities:'02:23 am Wed 04 Jul', '4th July 1990 (14:23)' and so on.

The actual components of the date are included in the format string as 'macros' preceded by %. For example, %MI is converted into the current minute and %W3 is expanded into the weekday of the form 'Mon', 'Tue', 'Wed' etc.

A fuller illustration appeared in September 1989's Arc Agora.

One final point to note is the variable summertime%, set to TRUE at the start. When the clocks go back in the Autumn and we return to GMT, change this setting to FALSE so the correct adjustments are made!

Over to you
Send your programs, ideas, hints and tips to: Risc Revue, BBC Acorn User, Redwood Publishing, 20-26 Brunswick Place, London N1 6DJ. Boundless fame plus a few readies will wing their respective ways to the talented few...



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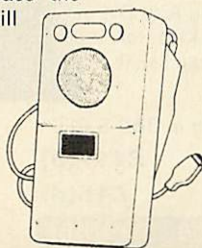
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Econet Bridge	**£174(b)**
Printer Server Rom	**£41(d)**
10 Station Lead Set	**£34(d)**
Master FS Utility Disc	**£17.25(d)**

MISCELLANEOUS ACCESSORIES

Ripper Stripper
A handy gadget to obtain clean tear-offs from fan fold paper **£4.50(d)**

Tidy Box
A moulded plastic pocket to store pens etc next to your micro. **£4(d)**

Mouse Mat
High quality mouse mat which can also be used as a cutting pad (scales in inches and cm) **£3.50(d)**

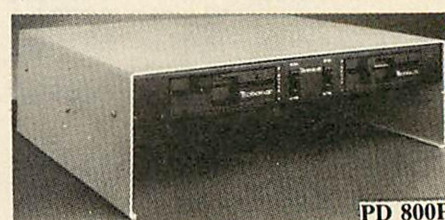
Mouse Cleaning Kit
An essential kit to ensure your mouse remains in perfect trim and provides precise operation **£4(d)**

TECHNOMATIC DISC DRIVES

A range of high quality high performance drives to meet the needs of all BBC Micro Users.
*All drives are fited with high quality slim line ultra lower power mechanisms capable of single and double density operation and offering fast track access and head setting times.
*5.25″ floppy drives are fitted with 40/80 track switches as standard at no extra cost. The switches are located in the front and clearly marked to indicate the status at a glance.
*All drives fitted with all necessary leads and are ready for operation on unpacking. The drives with the mains power supply are supplied with a mains lead fitted with a suitably fused 13A moulded plug.
*Our plinth drives have been thoughtfully designed and provide a choice of two 5.25″ drives or a combination of 5.25″ and 3.5″ drives.



TS 400


PD 800P

5.25″ Single Drives 40/80 switchable:

TS400 400K/640K	**£80(b)**
PS400 400K/640K with integral mains power supply	**£90(b)**

5.25″ Dual Drives 40/80 switchable:

TD800 800K/1280K	**£160(a)**
PD800 800K/1280K with integral mains power supply	**£170(a)**
PD800P 800K/1280K with integral mains power supply and monitor stand	**£185(a)**

PS400/PS351 are Compact/Archimedes compatible.
PD800/PD352/PD853 are Archimedes compatible.

3.5″ 80T DS Drives

TS351 single 400K/640K	**£69(b)**
PS351 3.5″ single drive with integral mains power supply in a 5.25″ case.	**£95(b)**
TD352 Dual 800K/1280K	**£126(a)**
PD352 3.5″ dual drive with integral mains power supply in a 5.25″ case.	**£139(a)**

Combo Drives (5.25″ & 3.5″ drives)

PD853	**£185(a)**
PD853 psu and plinth mounting	**£205(a)**

WINCHESTER DRIVES

Most popular range of Winchesters for BBC. Drives are housed in metal casing fan cooled and powered by switch mode psu for quiet, efficient and reliable operation.
Front end utility for Master, format and verify program and Tree Plan directory structuring utilities are included as standard.

P30HD drive	**£399(a)**
P60HD drive	**£529(a)**
P304HD + 40/80T DS Floppy	**£529(a)**

3M FLOPPY DISCS

5.25″ Discs in packs of 10

744 40T SSDD	**£5(d)**
745 40T DSDD	**£5(d)**
747 80T DSDD	**£7(d)**
3.5″ DSDD Discs	**£7.50(d)**

BULK DISCS

50 5.25″ 40T single sided discs with sleeves in lockable box.	**£20(b)**
50 5.25″ 80T double sided discs with sleeves in lockable box.	**£25(b)**
40 3.5″ 80T DS Discs in lockable box	**£38(b)**
Drive Head Cleaning Kits (5.25″ or 3.5″)	**£4(d)**

STORAGE BOXES

Library Cases:
10 × 5.25″ **£11(d)** 10 × 3.5″ **£1(d)**

Lockable Boxes;
3.5″: 40 Discs **£6(c)** 80 Discs **£7(c)**
5.25″: 50 Discs **£6(c)** 70 Discs **£7(c)**
100 Discs **£8(c)**

SPARE PARTS

BBC B/B+ Power Supply	**£65(b)**
BBC B Keyboard	**£52(b)**
BBC B Keyboard Connector	**£4.75(d)**
BBC B/B+ Video ULA	**£18(d)**
BBC B/B+ Serial ULA	**£12(d)**
KeySwitch B,B+, M (please specify original type)	**£1.75(d)**
UHF Modulator	**£4(d)**
16Mhz Xtal	**£2.50(d)**
17.734 MHz Xtal	**£2.50(d)**
6502A	**£5.50(d)**
4816 RAM (B)	**£2(d)**
Master psu	**£65(b)**
Master Keyboard	**£62(b)**
Keyboard Connector set (M)	**£5(d)**
1Mb OS ROM M	**£39(d)**
CF30060 ULA (M)	**£10(d)**
CF30047 ULA	**£15(d)**
ULA (512)	**£34(d)**
ULA (6502 & Z80 2nd Proc)	**£28(d)**
Power Supply (2nd Proc)	**£42(b)**
ARC Keyboard Assy	**£85(c)**
ARC Power Supply	**£65(b)**
Mouse	**£49(c)**
Drive Cable	**£5(d)**
Keyboard Curly Cable	**£22(c)**
Window Moulding	**£6(d)**
41464	**£8(d)**

If the parts you need are not listed please call us

UPGRADES FOR MODEL B

Acorn 1772 DFS Kit	**£49(d)**
ADFS ROM	**£26(d)**
ATPL ROM/RAM Expansion Board	**£37(c)**

TEL: 081-205 9558

Watford Electronics

Jessa House, 250 Lower High Street, Watford WD1 2AN, England
Tel: Watford (0923) 37774 Tlx: 8956095 Fax: (0923) 33642
Shop Hours: 9am to 6pm (Mon.-Sat.) Thursday 9am to 8pm. FREE customer car park.
All prices exclusive of VAT; subject to change without notice & available on request.
Credit Card Orders (ACCESS & VISA) Tel (0923) 33383 or 50234 (24 Hours)

Acorn
The choice of Experience



The choice before and after the experience

Archimedes micro

System	Basic	Mono	Colour	Multiscan
410/1	£1099	£1159	£1288	£1488
420/1	£1499	£1559	£1678	£1888
440/1	£2099	£2159	£2278	£2488

(Securicor carr. £10 on Archimedes)

Archimedes A3000

12 MONTHS FREE MAINTENANCE ON SITE

- A3000 Microcomputer £599
- A3000 + Learning Curve pack £699
- 3.5" External Drive £99
- Monitor Stand £22
- External Podule Case £14
- Serial Upgrade £19
- Dust Cover Micro only £5
- Dust Cover for Micro + Monitor £9
- User port/MIDI upgrade £49

Unbeatable SUMMER SALE

Offers on Archimedes Micro
(Extended by Popular Demand)
When you purchase an Archimedes Micro from Watford, look what you get FREE with it

Micro	Free Offer
A410/1	Upgraded to 2MB RAM & a 20 MB Hard Disc, (A420)
A420/1	Upgrade to 4MB RAM & a 40 MB Hard Disc, (A440)
A440/1	A TAXAN 770+ 14" Multisync Monitor
A3000	Upgrade to 2MB

+ 12 Months FREE On-Site Maintenance

ACCESSORIES

- NEW Multitasking RISC OS £29
- ROM Podule Acorn £45
- ROM Podule (Computer Concepts) £45
- ROM Podule (C C) with Battery Backup £59
- 2 Podule Backplane £25
- 4 Podule Backplane £35
- Backplane FAN only (for Hard Disc) £8
- 3.5" 800K 2nd Floppy Drive (305/310) £118
- 5.25" 800K external Floppy Drive £85
- I/O Podule (with Analogue port, User port, & 1MHz bus) £80
- MIDI add-on to I/O Podule £29
- MIDI Expansion Card £65
- Clares Armadeus Sound Sampler Board £69
- Sound Sampler Mono (Armadillo) £129
- Sound Sampler Stereo (Armadillo) £166
- Sound Sampler Stereo /Midi (Armadillo) £186
- Chromalock Podule (Wild Vision) £275
- Econet Network Board £46
- Archimedes IEEE Interface Adaptor £269
- Dual RS232 Podule £195
- 16 bit parallel I/O Card £195
- NEW - Archi MK II Replacement Mouse £39
- RB2 - An Archimedes Marconi Tracker Ball £46
- PC Emulator NEW Faster Version £62
- Software Developers Toolbox £159
- Floating Point Unit £549
- SCSI Adaptor Expansion Card £185
- Archi Real-time Digitiser £219
- Keyboard Extension Lead £6

Archi Books, see page 12 of our advert

NEW A3000 LEARNING CURVE

A very special offer pack consisting of the remarkable A3000 Archimedes microcomputer, Integral disc drive and a mouse. Welcome guide and user manual. A pair of applications disc containing Paint package, Drawing Application, Text and program editor, Music package, Games and Utilities programs.
First Word Plus wordprocessor and spelling checker, IBM PC Emulation package, Genesis applications, which contains: GEN DTP, Address & phone book, Scrap book, Recipes, Composers, Green issues, Planets, Story writing and Personal organiser. A demonstration Video Cassette and A parent's guide to the National Curriculum. All this plus Watford's incredible deal of a FREE upgrade to 2MB of RAM and FREE on-site maintenance cover for 12 months.

Turbo Charge Your Archimedes

(at an affordable price)

Increase the speed of your Archimedes by a factor of THREE to SIX times (depending on the software you are running), with Watford's ARM3 Upgrades.

- ARM-3 20MHz Upgrade Board £349
- ARM-3 30MHz Upgrade Board £399
- MEMCI Upgrade £49

Convert your Archi 410 to a 420 or 440 with Watford's unique Upgrade Kits

- **UP10** – to 2MB RAM + 20MB Hard Disc £254
- **UP15** – to 2MB RAM + 40MB Hard Disc £359
- **UP20** – to 4MB RAM + 20MB Hard Disc £420
- **UP30** – to 4MB RAM + 40MB Hard Disc £539
- **UP40** – to 4MB RAM + 53MB Hard Disc £599

(P.S. When purchased with an A410/1, the upgrades will be fitted at no extra cost)

Archimedes RAM Upgrade

All our memory upgrades are simple to fit. No soldering required.

- **R302-A3000** – to 2MB RAM Upgrade £95
- **R304-A3000** – to 4MB RAM Upgrade £299
- **R311-A305** – to 1MB RAM Upgrade £99
- **R312-A305/310** – to 2MB RAM Upgrade £285
- **R314-A305/310** – to 4MB RAM Upgrade £499
- **R412-A410/1** – to 2MB RAM Upgrade £85
- **R414-A410/1** – to 4MB RAM Upgrade £255

(Carriage on Add-ons £3)

Watford's 20Meg & 40Meg Archimedes Hard Disc

Watford Electronics' 20Meg & 40Meg hard disc fits internally into the Winchester slot provided.
It is fully compatible with Acorn's hard disc upgrade, (the only difference is our low price). Price includes the Hard Disc Drive, Controller Podule & fitting instructions. (Self parking fast hard drives.)
P.S. The 310 upgrade requires a backplane and a fan.

- 3HDP – Hard Disc Podule only £175
- 3HD20 – 20Meg H' Disc + Podule for 310 £319
- 3HD40 – 40Meg H' Disc + Podule for 310 £439
- 2 Podule backplane (Watford) £25
- 4 Podule backplane (Watford) £38
- Fan for the backplane £8
- 4HD20 – 20 Meg Hard Disc for 410 £169
- 4HD40 – 40 Meg Hard Disc for 410 £285
- A3000 Hard Disc Podule only £195
- A3000 20 Meg Hard Disc + Podule £369
- A3000 40 Meg Hard Disc + Podule £489

(Carriage £7)

Desk Top Publisher

Acorn's Archi DTP Package £125
Impression DTP Package £135

ARCHI WORDPROCESSORS

Wordwise + Disc	£20	P.Spellchecker	£40
Image Writer	£25	View	£45
Interword Disc	£20	Viewspell	£32
1st Word Plus – 3	£72	Viewindex	£12
Archie Spell Master	£39	Graphic Writer	£23

DATABASES

AlphaBase	£36	Interbase Disc	£20
Knowledge Organiser	£45	Multistore	£195

SPREADSHEETS

Intersheet Disc	£20	Viewsheet	£45
Sigmasheet	£55		

BUSINESS GRAPHICS

GammaPlot	£50	Interchart Disc	£20

INTEGRATED PACKAGES

Logistix – Database, Spreadsheet, Time Management & Business Graphics £89
Pipedream 3 – Wordprocessor, Database & Spreadsheet £125
(P&P on above £2)

GRAPHICS, ART, DESIGN & GAMES

GRAPHICS

Atelier	£84
Artisan II	£59
Pro Artisan	£85
Archeffect	£20
Autosketch II	£75
Graph Box	£64
Kermit	£46
Lingenuity Presenter II	£39
Render Bender	£59

GAMES

Alerion	£11
Arcade Soccer	£17
Battle -Tank	£14
Clares 3 Pack	£12
Conqueror	£19
Enthar Seven	£22
E-Type	£17
E-Type Designer	£15
Freddy's Folly	£10
Holed Out Designer	£17
Holed Out Golf	£17
Hyperpack (12)	£79
Hoverbod	£11
Ibix the Viking	£14
Inter Dictor	£25
Jet Fighter	£10
Minotaur	£11
Missile Control	£11
Orion	£12
Pacmania	£14
Repton 3	£17
Talisman	£14
Thundermonk	£11
Zarch	£15

Miscellaneous

Armadeus Sound Sampler	£59
Toolkit (Beebug)	£32
Toolkit (Clares)	£42
Hearsay Comms Pack	£55
Genesis	£70

SILICON VISION Corner

Data Vision	£74	Film-Maker	£59
Gerber Plot	£93	Office Tools	£219
Risc Basic	£74	ROBO LOGO	£54
Solid CAD	£74	Share Holder	£74
Super Plot	£20	Solids Render	£59
Super Dump	£20	Solid Tools	£199

- Arc PCB Professional £275
- Gate Array Design System £67
- Financial Accounts £129
- Realtime Solids Modeller £110

LANGUAGES (Archimedes)

- ISO-PASCAL; FORTRAN 77 £89 each
- ANSI C Release 3 £129
- Assembler; LISP or Prolog X £155 each
- LOGOTRON LOGO £55
- ROBO LOGO £54
- TWIN EDITOR £25
- RISC BASIC £85
- BASIC Compiler £89

(P&P £2 on above packages)

MINERVA's Archimedes Software

Sigmasheet	£55	Sales Ledger*	£53
Home Accounts*	£40	Purchase Ledger*	£53
Stock Manager*	£53		
Nominal Ledger*	£53	Reporter	£29
Ancestry	£59	Mailshot	£29
Gammaplot	£50	MultiStore	£195
System Delta+	£55		
System Delta + Reference Manual			£25
Order Processing/Invoicing*			£53
School Administrator			£118

** Requires System Delta*
(P&P on above items £2)

Archimedes to BBC Serial Link Mk 2

Using this simple data link, it is possible to solve all your BBC to Archimedes data transfer problems. The kit is supplied with a disk, and the necessary cable to connect the two computers.

New RISC OS Version **Only £15**

Archimedes 5.25"/3.5" Disc drive Interface

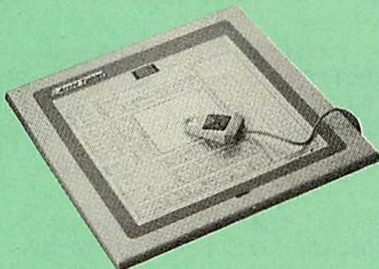
With this interface it is possible to connect almost any 5.25"/3.5" disc drive with its own power supply to the Archimedes. Upto 4 disc drives can be connected. NO SOLDERING is involved. Supplied complete with necessary lead.

Only £21

FREE On-Site Maintenance

This month we are also offering at no extra cost to all our customers, 12 months, On-Site Maintenance on all Archimedes Micros, Philips, Microvitec, and Multiscan COLOUR Monitors. Also on the full range of Panasonic Printers. Should your machine fail, simply telephone the maintenance engineer, who will call in within 12 working hours to repair the unit. (P.S. This offer is over and above our Unbeatable Winter Sale Offers on Archimedes Micro). Offer applicable only when bought at prices advertised in this advert).

Archi Graphic Tablet



This package allows Archimedes users to take advantage of the low cost graphpad (sometimes called a digitiser tablet, but not to be confused with a video digitiser!)

The Archi Graphpad offers performance and accuracy comparable to other graphics tablets priced at well over £400, and has the useful addition of a liftable cover, which can hold tracing material or menu templates securely.

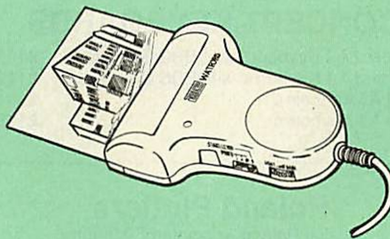
The software, which is in the form of a relocatable module (RM), intercepts the system calls which control the mouse, and so allows virtually all mouse based Archimedes software to be controlled using the tablet without any modification. The only exceptions are programs which use the serial port, as the tablet is physically connected to this port itself.

The software is supplied with a special adaptor lead to connect the tablet to the Archimedes' serial port, and a power lead which plugs onto the Archimedes' main board.

(For further details, please telephone or write in for our FREE catalogue.)

Special Price £249 (carr. £4)
(Price includes Tablet, Leads & Software)
Stylus Optional Extra **£29**

Archi Mk II Hand Scanner



Watford Electronics is now able to offer a complete hand held scanning package, possibly the most essential addition to any desk top publishing system. The package includes the most comprehensive utility software available for the Archimedes, a high quality, ergonomically designed to fit the shape of your hand, (see drawing above) scanner, which is fitted with a warning LED that will indicate if the scanner is being moved too quickly for accurate results. Additional twin guide rollers ensure precise tracking over the image, to make the best use of the high resolution available with this sytem. The yellow/amber illumination of our Mk II scanner, enables you to achieve optimum accuracy. It is capable of scanning upto an amazing 400 DPI. The scanning area is 4" wide and the height is only limited by the maximu amount of memory available.

On board ROM software supplied, is the most sophisticated Archimedes scanner software yet written.

Price £149 (P&P £4)

Special Discount Scheme

For Teachers, Lecturers & Education.
Please phone for further details.

Z88 Portable Micro



Only: **£195** (Carr £4)

FREE

With every Z88 purchased from us, we are giving away absolutely FREE, a Z88 to BBC Interface Link, 4 rechargeable batteries and a compact Mains Battery Charger worth £38.

ACCESSORIES

- 32K RAM Pack or 32K EPROM Pack £18.00
- 128K RAM Pack or 128K EPROM Pack £45
- 512K RAM Pack £175
- Z88 Eprom Eraser Unit £35
- Z88 Spellmaster for Pipedream £51
- Z88 Carrying Case £9
- Z88 Computing Book £9.95
- AA Nicad Rechargeable Battery £1.50
- Battery Charger Compact & Fast £6
- Z88 Serial Printer Cable £9
- Z88 Parallel Printer Cable £25
- Z88 to BBC Link £20
- Z88 to PC Link II £30
- Z88 to Macintosh £52
- Z88 Mains Adaptor £9
- Z BASE £56
- Z TAPE £42
- Z TERM £42
- Z88 Modem £149

By popular demand, we are now supplying refurbished and fully guaranteed BBC Micros with Disc Filing System
(Please telephone for price & availability)

ULTIMUM – Archimedes A3000 Podule Racking System

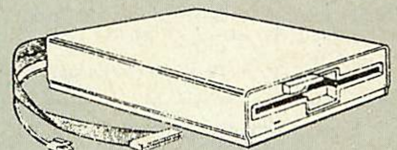
When Acorn originally designed the Archimedes micro, they released to all interested parties the specification of the expansion podule. This has now become the accepted standard for all manufacturers of Archi peripherals. The A300 & A400 both allowed expansion internally up to 2 or 4 podules. However, a newcomer to the affray has caused some upset. A3000 has only a single podule expansion slot, on the outside. There has been deliberation in the industry about a controversial "mini-podule" to be fitted to a special rack. This would entail a re-design of all the available podules onto a smaller board and understandably the manufacturers have rejected the idea completely. As always, Watford have come up with the only real solution to the A3000 expansion problem. The Ultimum Podule Racking System allows up to 3 full size standard A300/A400 series podules to be fitted to the computer. There is also provision for a hard disc drive and podule. Ultimum has its own PSU. There is also an IEC mains output socket for a monitor. It mounts on top at the rear of the computer, and allows direct access to the floppy drive and reset button, rather than obstructing access as on other non standard systems.

Watch this space for launch details.

BBC MASTER

MASTER 128K Micro incl. Acorn's View, Viewsheet, ADFS, BASIC Editor & TERMINAL plus FREE OFFER (see below) £399*(carr £7)*

FREE OFFER



A 5.25" Double Sided, 40/80 track switchable 400K Disc Drive complete with cables and a Utilities disc incl. 2 games, plus

Gemini's OFFICE MATE & OFFICE MASTER packages on Disc consisting of: Database, Spreadsheet, Beebplot graphics. Accounts packs: Cashbook, Final Accounts, Mailist, Easyledger, Invoice & Statements, Stock Control.
FREE with every BBC Master purchased from us during May

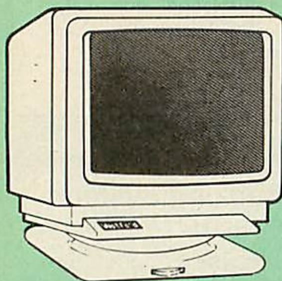
ADD-ONs & ACCESSORIES

Turbo 65C102 Add-on Module		£115
Econet Module for the Master		£47
Twin ROM Cartridge for Master		£9
Quad ROM Cartridge for Master		£14
Master Reference Manual I	(No VAT)	£14
Master Reference Manual II	(No VAT)	£14
Master Advance Ref Manual	(No VAT)	£17
64K Upgrade Kit for B+		£32
Acorn 1772 DFS Kit complete		£49
ECONET Upgrade Kit for BBC B		£42
ALL ECONET UPGRADES Available		
ARIES' IEEE Interface for BBC B & Master		£238
Morley Teletext Adaptor with ATS Rom		£99
Filestore E01S £899	Filestore E40s	£749
Filestore E60S £949	Ecolink	£270

(Carr. £2 to £7 depending on the weight)

Continued→ → → → → → → → →

MONITORS



12 months FREE maintenance on site

MICROVITEC 14"

- 1431 – Standard resolution as used on the BBC television computer programme £175
- 1451 – Medium resolution, suitable for word processing in mode 0 £219
- Cub3000 Medium Res for A3000 £195
- 1455 – MS Medium resolution, ideal for Archimedes £220
- 1441 – High res, exceeds the capabilities of the BBC Micro £359
- **1431AP** RGB + PAL and AUDIO £199
- **1451AP** RGB + PAL and AUDIO £255
- **2030 CS** 20" Med Res £380
- **2040 CS** 20" Hi Res £675
- Dust Cover for Microvitecs £5.50
- **Touchtec 501 Touch Screen** £239

14" MULTISCAN COLOUR

- **TAXAN** 775 Plus – 0.28 Dot pitch Ultra high resolution, anti-static screen £399
- **TAXAN** 770 LR Low Radiation, auto-scanning Ultra High Res £429
- **TAXAN** Multiscan 870 16" Monitor £575
- **EIZO** 8060H – For technical info. read the review in Micro User, Jan. '89 £389
- **EIZO** 9060SZ Low Radiation, Super High Resolution, Antistatic screen, multiscan monitor for a wide range of applications. 800 dots x 600 lines. Display for high res VGA. 0.28 Dot pitch £469

- **TAXAN** Super Vision 3 – High Res 12" Colour Monitor/with green screen switch for wordprocessing
  Special Offer **£179** (While stocks last)

PHILIPS

- **BM7502** 12" Hi-res Green Monitor £70
- **BM7522** 12" Hi-res Amber Monitor £71
- **CM8833** 14" Med. Res Colour Monitor £215

STAR BUY

- **PHILIPS 14"** Medium Res, dark glass, attractively finished Colour Monitor – supplied complete with RGB, SKART and Audio/Phono Inputs. A push-button switch toggles between Hi-Res monochrome green text mode and full colour display. (Please state the type of Connecting Lead you require).

ONLY £189

- **PHILIPS 14"** Refurbished monitor, same as above at a special offer price
  Only **£120** (Offer valid while stocks last)

Dust Cover for Philips Monitors £6
(Securicor carriage on Monitors £7)

SWIVEL BASES

By simply placing your monitor on one of our front adjustable professional swivel bases (see drawing at the top), you can easily adjust the viewing angle.

for 12" Monitors **£8** (carr. £2.50)
for 14" Monitors **£12** (carr. £2.50)

Anti Glare VDU Screen

These extremely effective, easy to install, 12" & 14" VDU screens eliminate harmful glare, improves contrast on colour monitors. Increases productivity in offices. A must for wordprocessor users.

£12

SPARE LEADS

BNC Lead for Zenith or Philips	£3
Skart Monitor Lead	£5
RGB lead for TAXAN Monitors	£3
Archimedes Colour Monitor Lead	£7.50

CONCEPT KEYBOARDS

Standard A3 Keyboard with BBC Software	£143
Standard A4 Keyboard with BBC Software	£117
Archi A3 Keyboard	£144
Archi A4 Keyboard	£118

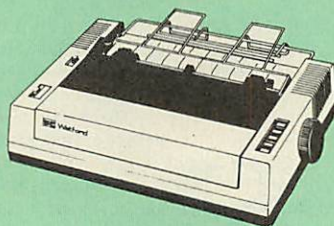
Roland Plotters

(Official Roland Appointed Distributor)

- **DPX 2500** POA
- **DXY 1200** £835
- **DXY 1100** £595
- **DXY 1300** £1015

Panasonic KX-P1081

12 MONTHS FREE MAINTENANCE ON SITE



SALE OFFER only: **£127**

(Price includes, FREE a 4ft Printer Lead, and a Dump Out 3, Screen Dump ROM worth £35 with every printer purchased from us)

KX-P1180 Printer Offer

Panasonic KX-P1180 printer, Dump Out 3, Screen Dump ROM & a BBC printer lead.

Offer Price £136

Panasonic Printers

- **KX-P1124** 24pin 80col. 192/63 CPS £215
- **KX-P1540** 24pin 136col. 240/80 CPS £415
- **KX-P1592** 9pin 136col. 216/45 CPS £275
- **KX-P1595** 9pin 136col. 288/61 CPS £345
- **KX-P1624** 24pin 132col. 192/63 CPS £349
- **KX-P1695** 9pin 132col. 330/86 CPS £349
- **KX-P4420** NEW 8PPM Laser
  Launch Offer £999

- **Panasonic KX-P4450i** LASER PRINTER
  Latest technology at Watford's special offer price **£1,299**
- Spare Toner **£29**
- A4 Feeder £55
- Drum Unit **£149**
- Developer £115
- 1MB RAM Upgrade £299
- 2MB RAM Upgrade £585

Panasonic Accessories

Cut Sheet Feeders

KX-P1592/1595 (P32)	**£175**	KX-P1540 (P35)	**£175**
KX-P1124 (P36)	**£85**	KX-P1180 (P37)	**£79**

BUFFERS

P12	4K buffer Board for 1081	**£55**
P42	32K buffer Chip for 1592/1595	**£16**
P43	32K Buffer Chip for 1540/1124/1180	**£16**

Serial Interfaces

P17 P1081/1592 **£32** **P19** P1124/1180 **£55**

Original Panasonic Ribbons

Guaranteed to last 3 million characters

P110	for KX-P1081, 1592 & 1595	**£8**
P115	for KX-P1180	**£8**
P145	for KX-P1124	**£8**
P140	for KX-P1540	**£10**

Colour Ribbons for KX-P1081, 1592 & 1595
Brown, Blue or Red **£9.95 each**

INTEGREX COLOUR JET

- Colour Jet 132 Printer £515
- Paper Roll £6.50
- Screen Dump Software £10
- Colour Cartridge £19.50
- Black Cartridge £11.25
- 100 A4 OHP transparencies £55
- 8K Serial Interface Optional £123

Citizen Printer Swift 24 £249

NEC PINWRITER P6/P7 Plus

NEC P6+ 80 columns	£439	NEC P7+ 136 columns	£575
Colour Option	£74	Serial Interface	£73
Cut Sheet Feeder	£125		
NEC Ribbons for		P6 £8;	P7 £9.50

Hewlett-Packard Printers

12 months FREE maintenance on site

HP Quiet Jet Plus	£437
HP Desk Jet Plus	£549
HP Paint Jet Colour	£719
HP LaserJet Series IIP	£829
HP LaserJet Series II	£1235
HP Laserjet II TONER	£85
HP Scanjet Plus	£1199
HP Desk Writer	£669
HP Laserjet II	£1275
HP Laserjet IID	£1899
1Meg RAM for Series II	£199
2Meg RAM for Series II	£399
1Meg RAM for Series IIP	£215
1Meg RAM for Series IIP	£449

Star Printers

LC10 Printer	£132	LP8 Laser	£1199
LC10 Colour	£175	XB24-10 r	£399
LC15	£275	XB24-15	£539
LC24-10	£199		
LC24-15	£349	XB Colour Kit	£35

Cut Sheet Feeder

LC10/LC24-10	£65	LC15/LC24-15	£125
XB24-10	£80	XB24-15	£139

EPSON PRINTERS

EX800	£429	LQ860 Colour	£520
EX1000	£564	LQ1050	£575
FX850	£315	LQ1060	£649
FX1050	£409	LQ2550+	£899
FX1060	£679	LX400	£132
GQ5000 Laser	£975	LX850	£179
LQ400	£198	SQ850	£515
LQ850	£459	SQ2550	£869
LQ550	£269		

CUT SHEET FEEDERS for

EX800/FX800/850/LQ800/850	£130
FX1000/LQ1000/1050	£175
LQ2550	£390
LX400/800/850/LQ400/500/550	£69

TRACTOR FEED for

LQ800 £44; LQ850/FX850 £69; LQ1050/FX1050 £85; LQ2500 £90; LQ2550 £90.

ACCESSORIES

- EX800/1000 Colour Option £55
- EX800/1000 Colour Ribbon £14
- LQ2500 Colour Option £65
- Multifont Card for LQ550/850/1050 £95

(Securicor Carriage on Printers £7)

EPSON PRINTER INTERFACES

All these interfaces fit inside the printer

RS232	£32	RS232 + 2K Buffer	£52
IEEE 488	£40	RS232 + 8K Buffer	£79

PRINTER LEADS

BBC Centronics 4' long	£5
BBC Centronics 6' extra long	£7
Compact's Special Centronics Lead	£7
Archimedes Printer Lead 6'	£6
Nimbus Centronics Lead	£6
IBM Parallel Lead 6'	£6
Double Ended 36 way Centronics Lead 4'	£7
Double Ended 36 way Centronics Lead 6'	£9
MSX Centronics Parallel Lead 4'	£12
RS232 Leads (Various)	P.O.A.

Listing Paper (Perforated)

● 1,000 Sheets 9.5" x 11" Fanfold Paper	£7
● 2,000 Sheets 9.5" x 11" Fanfold Paper	£11
● 1,000 Sheets 9.5" x 11" NCR 2 Part Fanfold	£19
● 1,000 Sheets 15" x 11" Fanfold Paper	£9
● 1,000 Sheets true A4 Fanfold Paper 70gms	£11
● 2,000 Sheets true A4 Fanfold Paper 70gms	£19
● Teleprinter Roll (Econo paper)	£4

(All our Fanfold paper is Micro perforated leaving a smooth clean edge when the tractor feed strips are detached).

Carriage 1K Sheets £2.50, 2K Sheets £3.00

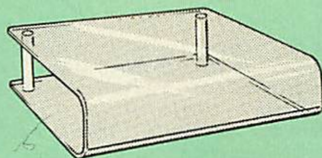
PRINTER LABELS

(On continuous fanfold backing sheet)

1,000 90 x 36mm (Single Row)	£5.00
1,000 90 x 36mm (Twin Row)	£4.90
1,000 90 x 49mm (Twin Row)	£7.50
1,000 102 x 36mm (Twin Row)	£6.25

Carriage on 1,000 Labels £1.00

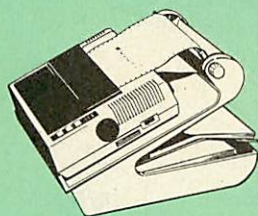
Perspex Printer Stand



Give you Computer System a touch of Class with our elegant, smoke finished Perspex Printer stand.

80 Column version **£16** (carr £3)
136 Column version **£20** (carr £4)

Professional Printer Stand



The professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and re-fold compartments ie. one above the other, the desk space required for your printer functions is effectively halved. Its ergonomic design ensures smooth paper flow and automatic refolding.

80 Column version £28 (carr. £3)
132 Column version £30 (carr. £4)

Printer Ribbons & Various Dust Covers

Type	Ribbons	Dust Covers
Brother HR15/20	£3.00	–
BBC Micro	–	£3.50
BBC Master	–	£4.00
Archimedes Micro pair	–	£9.00
Citizen 120D	£3.95	£4.50
DMP2000	£3.75	£4.75
EX/LQ800	£4.50	£4.50
EX/LQ1000	£6.75	£5.00
RX/FX80/85/800/MX80	£3.25	–
FX/MX/RX100/1000	£5.00	–
Kaga/Taxan KP810/815	£4.90	£5.00
LQ500/550/800/850	£4.50	£6.00
LQ1050/LQ2500	£7.00	–
LX80/86/800/850	£3.25	£4.50
M1009/GLP	£3.80	£3.75
NEC P2200	£6.00	£5.00
Panasonic KX1080/81	£3.50	£4.75
Panasonic KX-1124	£8.00	£5.00
SQ2500	£23.00	£5.50
Star LC10/NL10	£4.25	£5.00
Star LC24-10	£5.00	£6.00
Olivetti Ink Jet Cartridges (set of 4)	£9	

Our attractive Dust Covers are manufactured from translucent PCV. The seams are stitched and edges are taped to prevent splitting due to continuous use.

Universal Printer Sharers/Changer

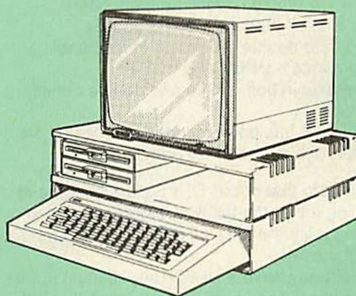
Connect upto 5 Micros to 1 printer or 5 Printers to 1 Micro with our combined, Sharer/Changer. These Units are made to a very high standard. For extreme reliability, they all have Printed Circuit Boards mounted inside the case, (not a Spaghetti Junction of wires). Internal connection is made via high quality ribbon cables.

(Ideal for School environments)

Connects	Serial	Centronics	P&P
2 to 1	£20	£22	£3
3 to 1	£27	£30	£3
5 to 1	£36	£39	£4

(Cables extra at £6 each. Please specify type required when ordering)

PLINTHS FOR BBC MICRO, MASTER & PRINTERS



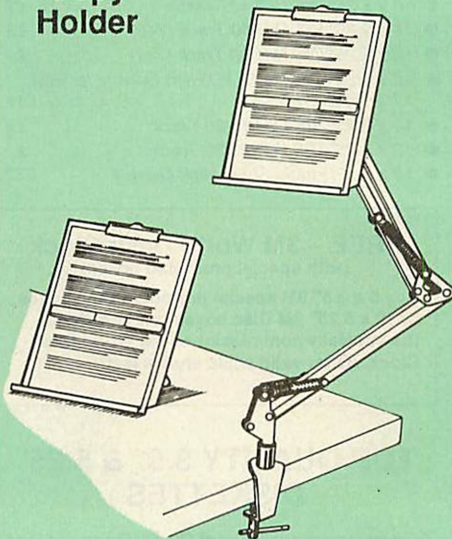
Protect your computer from the heat of your VDU. Our micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and VDU, whilst the double height version provides enough room for our stacked disc drive and other peripherals like, Eprom programmer, music unit or simply discs & stationary. The computer slides neatly in the lower section allowing easy access to remove the lid.

The single printer stand is equally sturdy but instead of cooling slots it has elegant cutouts on the sides. This allows easy access to paper from all sides. Colour: BBC Beige.

Single BBC Plinth	420 x 310 x 105mm	£13
Double BBC Plinth	420 x 310 x 210mm	£24
Printer Plinth	420 x 310 x 105mm	£12
Single Master Plinth	490 x 310 x 105mm	£14
Double Master Plinth	490 x 310 x 210mm	£26

(Carr. Single plinth £2; double plinth £3)

Copy Holder



Whether you want to type in your latest program or the draft of a new trilogy, Watford's manuscript holders are superb for holding you paper at the ideal height and angle to allow you to read and type in ease and comfort.

Available in 2 full A4 versions, desk resting and shelf clamping. Paper is held firmly by means of a plastic retaining ruler and a clip grip. (for resting books or magazines, the desk top version is recommended).

Desk Top **£7** (carr. £3)
Angle poise **£12** (carr. £3)

Handy Printer Switch

A handy two way compact printer switch that enables you to connect 2 Micros to 1 printer, or 2 printers to 1 Micro. Attaches easily to your printer, monitor, etc. A low cost solution for educational establishments. Ideal for those wishing to use a dot matrix and a laser printer. Available in two configurations.

Compact AB Switch Centronics	£19
Compact AB Switch RS232	£18

(Cables extra at £6 each)

MEGABUFFER 256



The Smallest 256K Printer Buffer Unit in the world **38mm x 130mm x 134mm.**

This new Megabuffer 256 from Watford is a full featured 256K Printer Buffer. The features are:

- Improves efficiency by making more efficient use of computer and printer.
- Compatible with any computer and printer that uses Centronics Parallel connections including all BBCs, IBM PCs, etc.
- Total compatiblity with all software.
- Cheaper phone bills when using your Modems.
- Ideal for those doing large graphics screen dumps that are slow to print.
- Multi-Copy facility allows you to print several copies via Megabuffer without going through your computer.
- Data Dump facility is included.
- Built in text unit for both the buffer & your printer.

Only £119 (carr £5)

Payment may be made by credit card, Connect card or cheque, but we also have available a range of finance terms, see the feature in our advert.

THE EPSON RX-FX-KAGA
Printer Commands Revealed

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you are with all sorts of printouts to show its capabilites – he may even have offered you a special price.

However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in your face.

Now what do you do, when this £400 piece of high technology refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out? Once again, Watford Electronics comes to your help with our new book entitled 'THE EPSON FX-KAGA PRINTER COMMANDS REVEALED'.

This book describes in plain, easy to understand English, how to use and make the most of your KP810, PW1080A or any other Epson FX80 compatible printers like Panasonic KX-P1080/1, etc., with the BBC Micro, both from Basic and Wordwise.

It describes in detail how to obtain the maximum in graphics capability from your printer and includes full indexes allowing you to cross index the numerous commands. Every command is explained in detail, with an accompanying BBC Basic program and an example of its use from Wordwise.

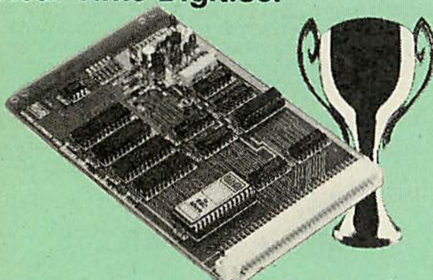
£5.95 (No VAT)



CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 50234 or 33383

Continued→ → → → → → → → → →

Archimedes Real-Time Digitiser



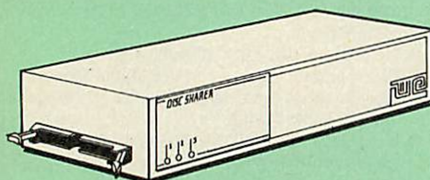
Now supplied with NEW RISC OS Version Software

Watfords' Archimedes Video Digitiser is the most sophisticated digitiser ever designed for a micro. It provides a fast and flexible means of capturing images from a video camera or recorder for display and manipulation on the Archimedes range of Micros. Off-air televison signals may also be digitised via a video recorder or TV tuner. Please write for further details.

Price £215

A Set of Colour Filters for colour image grabbing using a video camera	£16
New Risc-OS Software Upgrade	£39

DISC DRIVE SHARER



(Ideal for educational establishments)

At last, a low cost alternative to the Econet system.Watford's Intelligent Disc Drive Sharer allows you to connect 3 BBC micros (model B, B+ and Master series) to a single or double disc drive. Running under any DFS or DDFS, this intelligent unit will automatically queue the computers. Each computer has a status light dedicated to it. If it is green you will get immediate access to the disk, and red means that you are next in line. The unit plugs directly into the disc drive socket on each computer and is powered by the mains. (N.B. Not for use with ADFS.)

Offer Price : £55 Price includes 3 Cables

DISC PLONKER RACK



When using ones micro, there is a tendency to have more than one Disc on the desk. This exposes them to the harzards of fingerprints, scratches, dust, coffee and an untidy desk.
Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. Holds up to eight 5.25" discs.

Protection at Only: £2

Acorn & Watford DFSs

- Watford sophisticated DFS ROM £16.00
- Watford DFS Kit complete £69.00
- We will exchange your existing ROM for Watford's ultimate DFS ROM at only £12.00
- DFS Manual (comprehensive) £6.95
- Acorn DNFS ROM £17.00
- Acorn ADFS ROM only £25.00
- Acorn 1772 DFS ROM Kit £49.00

(The single Density DFS system is now old technology. Like Acorn, Watford too have decided to replace it with the their more up-to-date 1770 DDFS interface. We have informed most of the software houses of this decision in order that they can ensure compatibility with our highly sophisticated and fully Acorn compatible DDFS).

Watford's MkII 1772

Single/Double Density DFS

Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our Mk II DDFS Board with its 1770 Disc Controller, has been adapted to allow the use of Acorn ADFS as well. It also has all the commands of the Acorn's 1770 DFS, plus the added features.

Added features include:

- Acorn ADFS compatible – Use ADFS on our DDFS board.
- Tube host Code – No longer any need to have the DNFS in your machine to use Co-Processors, even the CoPro and Master 512.
- Auto 40-80 Track sensing – no need to fuss with 40/80 track switches (even works with protected disks).
- An extremely powerful 8271 emulation – ensuring compatibility with almost all software.
- New low profile – small footprint board.
- Fits with all third party ROM boards.
- Option to double the speed of file handling operations – BPUT and BGET.
- Operates in both single and double density modes.
- OSGBPB has been recoded, increasing still further the speed of file handling.

Please note that not all DDFS's are capable of providing either the full 80% storage increase or of allowing a file the full size of the disk – Ours allows both of these!
If you already have a DDFS (any manufacturer), and wish to upgrade to our MkII version, then simply return your existing ROM and DDFS board and we will supply the new DDFS for only **£39.00**.

- SPECIAL PRICE £44.00
- DDFS Manual (No VAT) £6.95
- We will exchange your existing DFS Kit for our sophisticated DDFS for only £30.00

Please note, as the MkII DDFS is a hardware and sofware upgrade, it is not possible for existing Watford DDFS users to simply exchange the ROM for the new version.

3M – DISKETTES

3M – SCOTCH Diskettes with Lifetime warranty from Watford Electonics your 3M Appointed Distributor

- *10 x 5.25" S/S D/D 40T (744)* £5
- *10 x 5.25" D/S D/D 40T (745)* £7
- *10 x 5.25" S/S D/D 80 Track (746)* £8
- *10 x 5.25" D/S D/D 80 Track (747)* £9
- *10 x 5.25" 1.6M D/S D/D High Density for IBM XT and AT* £14
- *10 x 3.25" S/S D/D 40/80 Track* £9
- *10 x 3.25" D/S D/D 40/80 Track* £9
- *10 x 3.5" Double Sided High Density* £22

FREE – 3M World Desk Clock
(with special promoted boxes)

Buy 5 x 3.5" 3M special promoted Disc boxes, or 10 x 5.25" 3M Disc boxes and qualify for the specially commissioned 3M World Desk Clock. (Offer valid while stocks last).

TOP QUALITY 3.5" & 5.25" DISKETTES

To complement our range of Quality Discs and Disc Drives. WE are now supplying SPECIAL OFFER packs of 10 Lifetime guaranteed discs. Each disc has a reinforced hub ring. Supplied complete with selfstick labels and a Plastic Library Disc Box.

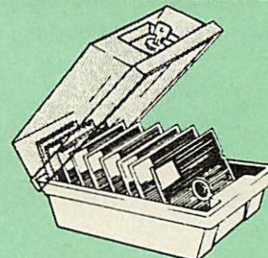
- *10 x **M3** 3.5" D/S D/D 80 Track* £9
- *10 x **M9** 3.5" D/S High Density* £22
- *10 x **M4** 5.25" S/S D/D 40 Track* £5
- *10 x **M5** 5.25" D/S D/D 40 Track* £7
- *10 x **M7** 5.25" D/S D/D 80 Track* £9
- *10 x **M8** 5.25" D/S H/D Hi-Density* £13
- *M2 3" Double Sided* £3 each

FLOPPY HEAD CLEANER KIT

The heads in floppy drives are precision made and very sensitive to dirt. The use of cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. it is very simple to use. Available in 3.5" & 5.25", please specify.

Price £4

ANTISTATIC LOCKABLE DISC STORAGE UNITS

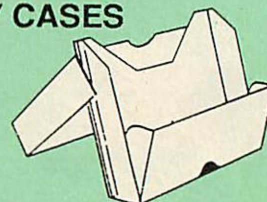


Gives double protection – Strong plastic case that affords real protection to your discs.
Antistatic helps avoid data corruption whilst in storage. The smoked top locks down.
Dividers and adhesive title strips are supplied for efficient filing of discs.

- **M35** – holds up to 50 5.25" discs £4.95
- **M85** – holds up to 95 5.25" discs £6.95
- **M25*** – holds up to 25 3.5" discs £4.95
- **M50** – holds 50 3.5" discs £6.50
- **M10** – holds 8 of No. 10 Data Cartridges £15

* Not lockable

PLASTIC LIBRARY CASES



Holds up to 10 5.25" Discs. Only £2.00

DUST COVERS (For our Disc Drives)

Single CLS (without PSU)	£3.20
Single CS (with PSU)	£3.25
Twin CLD (without PSU)	£3.85
Twin CD (with PSU)	£3.90

DISC ALBUMS

Attractively finished in black leather-look vinyl. Stores up to 20 discs. Each disc can be seen through the clear view pocket.

£4

Special BULK OFFER on 5.25" DISCS

(Supplied packed in Anti-Static Lockable Storage Units)
(Lifetime warranty on Discs)



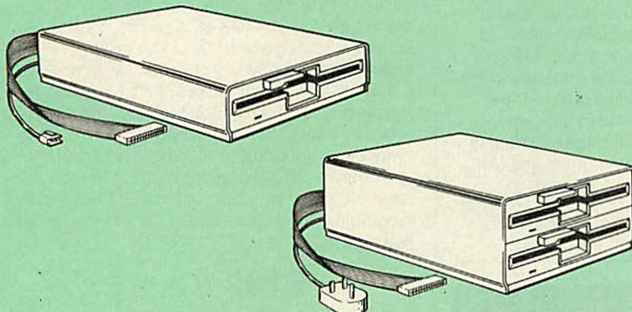
BULK PACK DISCS in lots of 100

Type	S-S 40T	D-S 40T	D-S 80T
Without Sleeves	£30	£35	£40
With Sleeves	£33	£38	£43

Quality Disc Drives from Watford

To help you decide which drive is the most suitable for your needs (and your pocket!), we have produced the table below.
The tinting on some of the boxes is used to indicate which Drives are 40 track (non-tinted) and which are 80 track (tinted). All our 80 track drives are already fitted with a 40-80 select switch.
***All our Disc Drives are Double Sided and will operate in both Single and Double Density modes.** Extensive experience of the usage of disc drives suggests that the JAPANESE drives currently represent about the best in terms of speed, reliability and overall "elegance" available for the BBC Micro.*
Various UK "manufacturers" of disc drives for the BBC micro (more accurately, "packagers" label other manufacturers drives with their own name). We buy the high qulity NEC and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public. If you look around the popular BBC micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, some of the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.
*Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate (extensive tests within our workshops have confirmed this). All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. **Ideal for Schools & Colleges.** We are now able to supply all single disc drives with Power Supply, in either single or dual case. (Dual case has a twin data cable and a power supply capable of driving two disc drives) allows easy expansion to a dual drive unit, at a later date. Prices stated in the pricing boxes below are for single drives in standard single cases. Single drives in a dual case cost an extra £18. (At Watford we anticipate your needs of tomorrow, not just today!)*
When using a BBC Micro, most people find themselves short of desk space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space) your BBC Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with a Watford plinth. (Turn to the 4th page of our advert for the Plinths).
P.S. All our 5.25" Disc Drives with PSU are compatible with the Compact Micro. All you require is the special Compact Disc Drive Cables designed by us.

Our Disc Drives conform to BS415



"Test Bureau Approved for Use in Education"

Capacity	Drives without P.S.U.		Drives with P.S.U.	
	Single	Twin	Single	Twin
400K (720K)	CLS400S £74	CLD400 £168	CS 400S £83	CD400 £165
800K (1,44M		CLD 800S £149		CD 800S £162

● TWIN Disc Drive Case, complete with Power Supply & Cables **£43**
Securicor carriage on Disc Drives £6 to £7

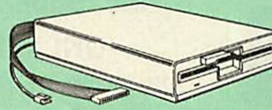
Prefix C = Cased Drive
L = Less PSU
S = Single
D = Double

Suffix S = 40-80 Switchable

e.g.. CLS400S = Cased Disc Drive, Less power supply unit, single 5.25" 400K, (720K in double density); Double sided; 40/80 track switchable.

Cable to connect 5.25" Disc Drives to BBC Compact
Single £9 Twin £12
Special Cable to connect both 3.5" and 5.25" Disc Drives simultaneously to the BBC Compact £13

Special 40/80 Disc Drive/DDFS Mk II Offer



- The popular 40/80 track 400K single Disc Drive, Double Sided, cased with Cables. Plugs directly to your Micro.
- Watford's extremely popular DDFS Disc Interface (allows 720K storage). Will run in both Single & Double Density modes.
- A comprehensive User Friendly Manual.

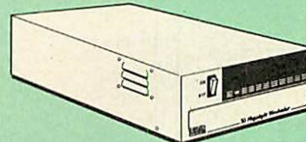
A Bargain at Only **£119** (£7 carr) (Offer valid while stocks last)



3.5" DISC DRIVE OFFER

These top quality 3.5" Double sided, 80 track, 1 Megabyte (unformatted each Disc Drives), are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc.

Drives to connect to BBC Micros own PSU
● **CLS35 400K Unit £65** ● **CLD35 Twin 800K £119**
Drives with built-in Power Supply Unit
● **CS35 Single 400K £85** ● **CD35 Twin 800K £129**
(P.S. CS35 Single is supplied in a twin case with a blanking plate to enable easy expansion to a dual drive at a later stage).

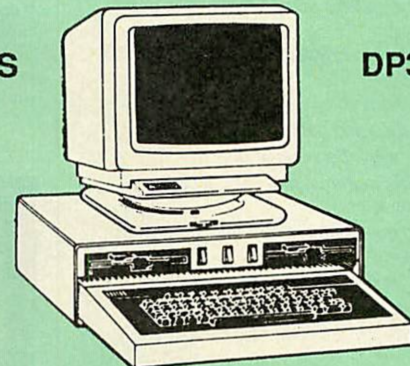


WATFORD's WINCHESTER DRIVES

Undoubtedly the best value for money Winchester Hard disc available anywhere for the BBC Micro.
This 30 Megabyte hard disc is completely compatible with the Acorn ADFS – that's why we have bundled it with each Winchester drive, along with a Utilities Disc.
Finished in rugged metal and fetching BBC beige, the Winchester has an internal fan, so quiet you won't even hear it! A switched mode power supply and a neon-lit on/off switch are there along with a light on the hard disc to tell you when it is working – just compare the price with our competitors' 20 or 28 Mbyte discs!
Compatible with the Master, and the BBC B (with 17 X disc interface).

● 30 Megabyte BBC Hard Disc **£395** (carr £7)

CDPM 800S **DP35-800S**



Twin 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC Micro. Supplied complete with integral power supply, cables and Utilities disc. The mains switch with neon On/Off light indicator, and the two 40/80 track switches are mounted on the front panel for ease of use.

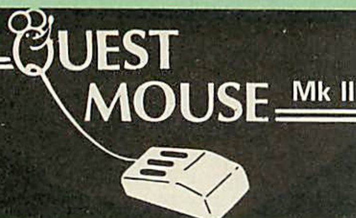
CDPM 800S for the BBC B & Master £175

A Double disc drive with a difference! Times are changing fast for the floppy disk, and whilst the current standard for the BBC B and Master series is the 5.25" disk, the standard of the future will most certainly be the smaller; faster and more reliable 3.5 inch disks – now a standard feature of both the Master Compact and the Archimedes Series.
To support the present disc drive users, and cope with the future, we have designed our own plinth-mounted disk system – called the DP35 800S. It contains both the 5.25 inch and the 3.5 inch drive formats as well as offer a firm and rigid support for a monitor on top. With the BBC Micro underneath, the plinth makes a surprisingly small footprint on the desk – leaving you more space to work with.
The 5.25" disc drive is 40/80 track switchable. DP35-800S has its own power supply, independent of the BBC Micro.

DP35-800S for BBC/Master £165

(Securicor Carr. £7)
(The above drive units are 2 Megabytes unformatted)

Continued→ → → → → → → → →



- Quest Mouse II & Quest Paint £58
- Quest Mouse II, Quest Paint, AMX Stop Press & Pagefont £89
- Quest Mouse II only £29
- Quest Paint Software only £34
- Quest Font Disc (22 Text Fonts) £15
- Quest Mouse Mat (Red or Blue or Green please specify) £3
- Part Exchange your unreliable AMX Mouse for a Quest Mouse for only £22

(P.S. Quest Paint is not compatible with BBC Compact)



Winner of the BBC Acorn User 1990 Award for the Best Art/ Graphics software

ConQuest

Quest combined with ConQuest and Acornsoft GXR ROM make up THE MOST POWERFUL drawing packages available for the BBC range. Quest Paint is able to take advantage of almost any additions to your machine, such as Shadow or Sideways RAM. ConQuest takes this principal even further, by utilising the otherwise normally incompatible Sideways RAM facility by holding pictures in them.

Some of the features are:

- *Pick filenames off the screen for loading and saving.*
- *Rotate a cutout to any angle and Distort it to any four sided shape.*
- *Has Built in Font editor.*
- *Default brushes and patterns on startup.*
- *16 x 16 font available on start up.*
- *Ability to reset patterns, fonts and brushes to default at any time.*
- *ROM based enhanced Epson and compatible printer dump.*
- *ROM based enhanced extended picture routine.*
- *Ability to create and abort extended pictures.*
- *Improved disk access speed for extended pictures.*
- *User definable sideways RAM driver for incompatible sideways RAM systems.*
- *Ellipses at any angle on Master 128 (or B with GXR ROM).*

ConQuest ROM Package £30
(Price includes software in ROM and a comprehensive Manual).
(Not Compatible with BBC Compact)

NEW

ARCHI Mk II MOUSE

An extremely reliable replacement mouse for Archimedes Micro £39

RB2 Marconi TRACKER BALL

RB2 (AMX/Quest compatible)	£45
RB2 including Quest Paint	£75
RB2-A for Archimedes	£46

THE NEW Mk III AMX MOUSE

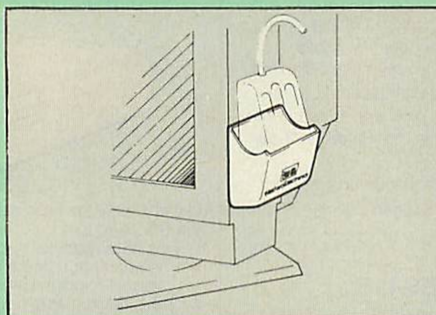
Inc. Super Art package

ONLY: £59 (carr £3)

(Please specify for BBC, Master or Compact)

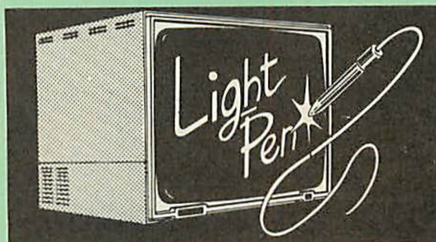
MOUSE MAT	£3
AMX MOUSE ONLY	£29
AMX SUPERART Package	£34
AMX STOP PRESS – A Desktop publishing software. Works with Keyboard, Joystick or a mouse	£32
PAGE-FONTS – Over 20 Fonts for use with AMX Pagemaker	£13
AMX DESIGN (ROM)	£55
AMX XAM Educational	£15
AMX EXTRA EXTRA	£16
AMX MAX A gem of desktop (ROM)	£20

WE MOUSE HOUSE



Treat your mouse to a cosy Mouse House. This handy little gadget solves the problem of where to store your mouse when it is having a rest. Made of sturdy plastic, the WE Mouse House attaches to the side of your computer, monitor, disc drive or desk. It protects it from damage when not in use, yet within easy reach when you need it again. There is also a second compartment for your pens and pencils – and at £4 it doesn't cost a rodent's ransom.

Price £4



Our Mark II Light Pen is the very latest in light pen technology. It is totally insensitive to local lighting conditions and works with many different monitors. The pen only responds to the High Frequency light produced by your monitor/TV. An LED indicates when valid video data is being produced. A conveniently located switch is also fitted. (Price includes FREE software Disc and Operating Manual)

Only £21

FLEET STREET EDITOR

Software pack for BBC Micro	£33
Software pack for the Master	£39
Admin Xtra Disc Utility	£13
Walt Disney Disc Utility	£13
Fonts N Graphics Disc Utility	£13

BEEB VIDEO DIGITISER



"Test Bureau Approved for Use in Education"

Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro.
This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket.
Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem. The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.
Both the black and white levels can be adjusted manually for the optimum picture, or switched to automatic for unattended use. The image produced can be reversed if necessary.
Full controlling software is supplied on a normal sideways ROM and this is easily accessed via additional ★ commands. The package is designed to allow easy input of complex screens and give full access of the data to the user. Once on the screen, the image can be used as a normal graphics screen, allowing any of the usual graphics commands in BASIC or other ROMs to work on it.
A special print dump routine is included with the driver programs. This is specially designed to produce a fast, correctly proportioned picture, with reduced "contouring", resulting in an accurate reproduction of the original image. Detailed examples of driving this unit from BASIC or other languages are all provided in the extensive manual supplied.

£109 (Carr. £5)

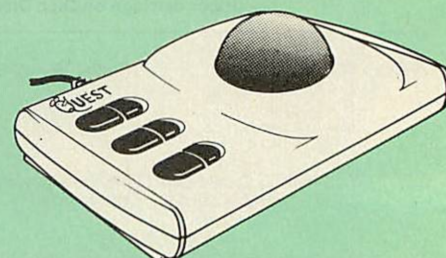
(BBC B+ and Master compatible, except Master with Econet)

(Price includes) Digitiser Unit, Software in ROM & a Comprehensive Manual)

NEW

QUEST – Tracer ball

An attractively finished, extremely reliable, mouse replacement, input device. Requires very little desk space. Connects directly to your BBC B, BBC Master or Archimedes Micro.



QT-10 BBC/Master Version	**£32**
QT-20 Archimedes Version	**£35**





Winner of the BBC Acorn User 1990 Award for the Best DTP/ Word Processor

The WAPPING EDITOR

The Wapping Editor from Watford Electronics represents a breakthrough in Desktop Publishing for the Beeb. The package includes a 64K ROM containing ALL the software needed to get into print fast; a very sophisticated graphics module, professional quality typesetting software, a word processor, a comprehensive font editor for designing your own typefaces, and a variety of printer dumps. This mouse-driven system is designed for the BBC B, the B+ and Master computers and will take full advantage of any Sideways and Shadow RAM that may be fitted. It will run under DFS, ADFS and Network filing systems and requires as a minimum just a single 40 track drive.

Included with the system is a utility disc containing several high quality fonts, various utilities and a ROM image of a Support ROM. A comprehensive 100 page manual completes the package. The Support ROM contains routines to allow an area to be rotated to any angle or distorted to any four-sided shape. Also included are facilities to draw ellipses at any angle and sectors, segments and arcs (in Master or BBC B with Acorn GXR). Another of the features of the Support ROM is a 'Turbo DFS' which gives DFS access times comparable with those of ADFS.

PAGE LAYOUT SECTION

The Wapping Editor may be used to create pages of any size from an A6 to a full A3 page. If none of the eight default page types suit your purpose, the stand-alone page creation program may be used to create pages to your own requirements. By using proportionally spaced fonts and genuine microspacing it is possible to print over 150 characters across an A4 page. A unique feature of the Wapping Editor is the 'A5 x 2' page size allowing two A5 pages to be printed side by side onto a single A4 sheet.

The graphics module is a mode 0 version of the highly acclaimed Quest Paint package, and incorporates all the same drawing facilities, e.g. pencil, brush, airbrush, polygon, circle, ellipse, fill, cut-and-paste, etc., etc.

Text may be typeset, either justified or unjustified, in any font anywhere on the page. Simply select which font and text document you wish to use, and pull out a rectangle on the page where you want the text to be – it's as simple as that! Multiple columns may be printed just as easily and a special 'expand' feature may be used to expand the microspacing so that the document exactly fits the space defined.

WORD-PROCESSOR

The integral word processor is the ideal tool for producing your text documents, although text can of course be read in from any of the other popular word processors such as View, Wordwise etc.

cont./-

THE FONT EDITOR

The font editor module will allow you to design your own typefaces or to modify the ones provided on the utility disc. This sophisticated editor has numerous functions designed to take the tedium and frustration out of producing good looking, well balanced fonts. Each character may be individually proportionally spaced and characters of any size up to 16 x 16 pixels may be defined.

Upgrading to the Wapping Editor could not be easier since the font editor will convert fonts from other packages, such as Quest Paint or Stop Press (formerly Pagemaker), into Wapping Editor format and a mode conversion utility will convert any screen in modes 1, 2, 4 or 5 into a full grey-scale mode 0 screen. Pictures may also be 'grabbed' from a video source by using the Watford BEEB Video Digitiser, either independantly or from within the Wapping Editor package.

Wapping Editor Software Pack £69
Wapping Editor plus Mouse £89

(Wapping Editor only works with Master Compact if a Mertec Expansion box is fitted)

Wapping Art Disc

Over 250K of clip art to cut and paste into your Wapping Editor pages. Pictures include maps, transport, people, media, sport, games etc.
Two 'ratio' screens for use with hi-res and rotated A5 pages to ensure images are not distorted when printed out.

Music writing symbols in the form of pattern and brush for quick production of manuscripts are included together with staves.

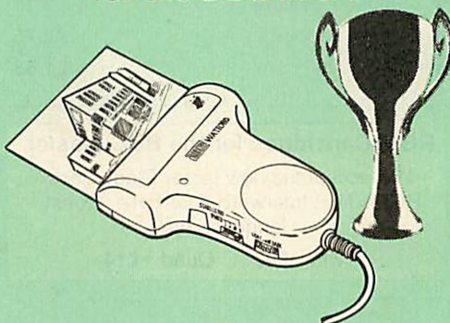
There are two prepared hi-res pages layed out for printing labels, both single and double width. Ready made label designs are included but these can be easily replaced with your own designs.

A Mode 0 screen dump routine is also included. To pack such a large amount of data onto the discs the screens have been compressed and routines to compress and expand Mode 0 screens are included on both discs. Using the packing routine you can archive large numbers of screens onto a single disc.

£15

The Beeb HandScan
Hand-held Scanner for the BBC Micro





Watford Electronics are pleased to announce the launch of the first hand held scanner for the BBC Micro. HandScan is a compact unit which will allow photographs, diagrams, or any other documents to be digitised quickly and easily, to then be used in a desk top publishing package, art program, or even in your own Basic programs! These useful devices have been available for faster and more expensive micros for some time, but only now is Watford Electronics able to offer the BBC Micro computer.

The HandScan plugs directly into the 1MHz bus on the BBC while a comprehensive set of utilities provided by the sophisticated ROM firmware. The scanner has a resolution of either 100 DPI or 200 DPI when accuracy is essential. Pictures as wide as 4" may be scanned in mode 0 and various types of dithering may be selected to simulate the grey levels of a scanned picture.

All necessary software has been included in the firmware to allow the scanner to read images directly into our Wapping Editor with little more than the click of the mouse. The digitised picture may then be incorporated into your magazine, newsletter, report or any other document.

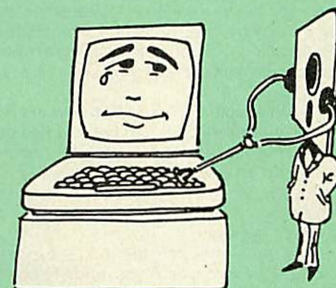
Beeb HandScan & Firmware **£135**

Wapping Font Disc

Sixteen Wapping Editor fonts including smaller versions of Oberon and Daisy and two new sizes of the standard font.
Also included are three Mode 0 screens containing giant 'headline' fonts to cut and paste to create extra smooth headlines.
Supplied complete with instructions.

£12

DIAGNOSTICS DISC



The BBC Micro is a very complex machine and thus diagnosing a fault can be very difficult. At Watford Electronics, we realise how difficult it can be when faced with a problem, finding yourself a long way from your nearest dealer, or even just uncertain about your Beeb's health, but not wanting to waste time and money taking it to be looked at.

The solution to these problems is here now, in the form of the Watford's Diagnostics Disc. This excellent utility is specially designed to test out the following areas of your Beeb:

RAMs, ROMs, ULAs, Sound, Keyboard, Disc, RS423, ADC, User Port, Printer Port, Cassette, Joysticks, Speech, Disc Drives, 6502 and Z80 2nd Processors.

This utility is an invaluable aid for all those who take the reliability of their system seriously. A comprehensive manual provides full operating details and a list of possible causes and remedies for any faults that you may find along the way. The package also enables a permanent equipment and service record to be maintained.

Only £20.00
(Only suitable for BBC B with 8271 DFS)

VISA Access
CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 50234 or 33383

NEW

Beeb DOS 2.2

The BBC and IBM PC's are the most popular micros in the UK. The BBC is firmly established in the education sector and the IBM is the industry standard in the business world. The pools of information and applications held on these computers are immense, yet the means of passing information between them are very limited. Beeb DOS provides a practical method of transferring information between these two micros.

Beeb DOS is a collection of utilities which run on the PC's and enable it to read and write information on BBC discs. You can transfer files between your PC's 360K floppy, high density floppy or hard disc and your BBC discs. In addition Beeb DOS allows you to catalogue, format and compact BBC discs and delete, re-name, lock and unlock BBC files, all on PC's. Each Beeb DOS utility is written in IBM assembler and is run directly from PC or MS-DOS. The Beeb DOS utility can be run from floppy disc, hard disc or RAM drive.

Beeb DOS is supplied on an IBM 5.25", 360K disc complete with a comprehensive operating manual.
(Will only work on 360K Disk Drives)

Price: £39

(Please write in for technical literature)

Continued→ → → → → → → → →



ARIES CORNER

B-32 Shadow RAM Card

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

With the B32, the programmer gets up to 28k of RAM available for Basic, Logo, Cobal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory for View, ViewSheet, Wordwise Plus, Interword and many other applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved ★FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as th printer buffer) or to load tape programs into a disc system.

The B32 simply plugs into the 6502 processor socket on you BBC micro – no flying leads to connect and no soldering. Provision of the onboard ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

- Recommended by Computer Concepts for use with their Inter series of ROMs.

Price: **£59** (carr. £3)

Aries B-12 Sideways ROM Board

The B-12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on the board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16k of RAM using 6264 static RAM chips.

If you do not have a B32 or B20, a small adaptor module (the Aries-B12C) is available at a nominal cost

Price:		
	Aries B-12	£36
	Aries B-12C	£5

ARIES B-488 IEEE-488 INTERFACE UNIT

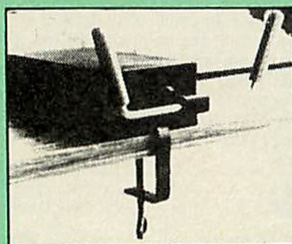
The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB or 'HP IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

£238 (Carr £3)

VOLTMACE JOYSTICKS

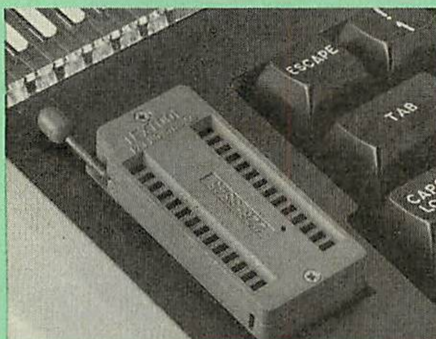
Delta 3B Single Joystick	£10
Delta 3B Twin Joysticks	£15
Delta 3C Joystick for Compact	£10
Delta 14B Single Joystick	£11
Delta 14B/1 Adaptor Module	£12
Transfer Software Disc-Tape	£7
Delta-Cat A mouse eliminator Joystick for the Archimedes	£24

Delta Base B



Analogue aircraft style yoke Joystick to run in the analogue port of the BBC B & Master 128 — £25

Sideways ROM ZIF Socket System



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

- Very simple to install. NO SOLDERING required. The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.
- The low profile of the socket allows unrestricted access to the Keyboard.
- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.
- This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must for professionals and Hobbyists alike.)
- BBC, B+ and Master compatible.

ONLY **£18** (carr £3)

Low Profile CARTRIDGE SYSTEM

Complete System consists of: Low profile ROM Cartridge, Socket housing, Cable assembly, 5 labels and a library storage rack for the BBC B.

● Complete System	£11
● Spare Cartridges	£2.75
● Spare Rack	£1.65

ROM Cartridges for the BBC Master

Will accept the new larger Piggy Back ROMs like: Interword, Interbase, Quest, Conquest, etc

Twin **£9**; Quad **£14**

16K Disc Ram Module

(16K Sideways RAM Module)

Complete with such features as read and write protection, these new modules from Watford Electronics are ideal for the hobbyist, software developer and ROM collector.
Key points to note about this new addition to the Watford range of products are:

- Write protection (useful in a variety of circumstances)
- Compact construction
- No overheating or overloading problems.
- Free utilities disc supplied
- Can be used as a 16K PRINTER BUFFER.
- Ideal for profressional software development.
- Supplied with utilities software disc.

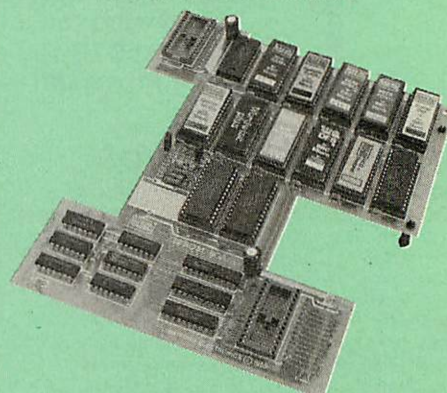
Only: **£29** (carr £2)

Optional Battery back-up fitted — £3

STAFF VACANCIES

Watford Electronics is the leading supplier in the Acorn computer field and has estabished itself in the PC compatible markets with its Aries PC computers. In its eighteen year history. Watford has always kept itself at the forefront of the new technology. Due to our latest expansion, we require staff to man our BBC/Archimedes and PC Technical Departments. Applicants will be required to be familiar with BBC/Archimedes hardware and software, and PC staff will need to be familiar with PC computer hardware and software, and PC staff will need to be familiar with PC computer hardware. Good rates of pay, excellent prospects. Subsidised company accommodation is available to single persons if required. Telephone Keith Archer or Richard Overfield for interview, or write to us enclosing your CV.

SOLDERLESS SIDEWAYS ROM SOCKET BOARD



The key features of this new, no fuss, easy to install quality product from BBC leaders Watford Electronics are as follows:

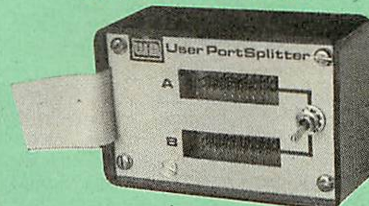
- Increase your BBCs capacity for ROMs from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Minimal space required.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish") allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £35
Battery Backup fitted **£39**
Battery Backup only **£3**
16K Sideways RAM **£8.50**
(carriage £3)

- Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer.

Only: £8

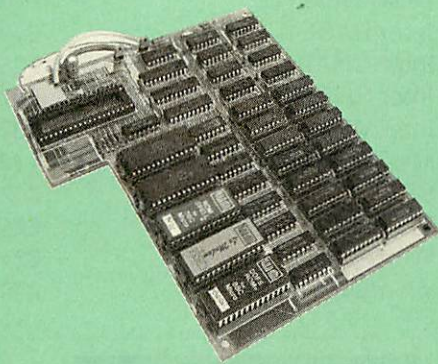
USER PORT SPLITTER UNIT



Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows two units to be connected to the User Port simultaneously, and select between them simply by toggling a switch. This device is particularly useful for those people using Quest Mouse and the Watford Video Digitiser or any similar combination

Excellent Value at **£22** (carr £2)

ROM/RAM CARD



Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 7 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, the new Watford Electronics ROM/RAM board. This highly versatile and sophisticated board represents the latest in "2nd generation" sideways ROM technology for the BBC micro, designed to satisfy the serious BBC user.

- NO SOLDERING required to fit the board.
- NO User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Compatible with BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROMSPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM-RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM-RAM Board.

The ROM-RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, for later.

NTRODUCTORY PRICES:

- ROM/RAM card with 32k dynamic RAM £48
- ROM/RAM card with 64k dynamic RAM £65
- ROM/RAM card with a massive 128k dynamic RAM £109

(carriage on ROM-RAM Card £3)

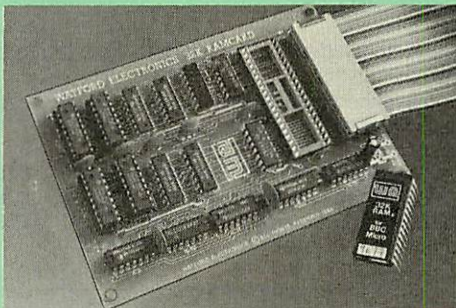
OPTIONAL EXTRAS:

- 16k plug-in Static RAM kit £9
- 16k Dynamic RAM for Upgrade £13
- Battery backup £3
- Read and Write protect switches ....£2 each

Complete ROM-RAM board
All options installed £115

P.S.
IS your existing ROM Board overflowing with ROMs? Do you need more Sideways RAM? Is your Board unreliable? Then upgrade to Watford, ROM/RAM Board and pay £5 less.

32K
SHADOW RAM-Printer Buffer
Expansion Board



A MUST FOR WORD PROCESSING

Watford Electronics now brings you the latest state-of-the-art MEMORY EXPANSION BOARD for your BBC microcomputer. Don't throw away your BBC B for a BBC B Plus or BBC Master. Just plug the ribbon cable into the 6502 processor socket, and fit the compact board inside the computer. Immediately you will gain not 16k or even 20k, but a massive 32k of extra RAM!!!

- IMPROVE your WORD PROCESSING system, whether disc or cassette based. Don't wait for a slow printer – type in text while printing. TWO JOBS DONE SIMULTANEOUSLY and £100+ saved on a printer buffer.
- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28,000 bytes free – 5 times as much as normal.
- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24k of text in memory. This product is recommended as an ideal complement by Computer Concepts.
- Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20k of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28k of program space.
- Use the FULL 32k or the bottom 12k of the expansion RAM as a PRINTER buffer for PARALLEL or SERIAL printers, sound channels, RS432 etc. Print large text files while running long graphics programs, and have all your buffer options available as well (*FX15,21,138, 145,ADVAL etc). Please note only a 12k printer buffer can be used with Wordwise or Wordwise-Plus, due to the way they are written.
- Unique facility to turn ROMs off and on again. Unlike all other ROM managers, this feature does not use 'unofficial' memory. Two bytes of normally user-inaccessible memory on the RAM card are used to ensure ROMs are disabled WHERE OTHER ROMS FAIL.

Only £59 (carr £3)
(Price includes a comprehensive manual and the ROM)

Acorn Speech Synthesizer package complete, for the BBC B Microcomputer
Special Offer £18

Watford Electronics are:

- Acorn Qualified Dealer & Econet Referral Centre
- ARIES PC Dealer/Distributor
- Cambridge Computer Dealer
- Epson Silver Centre
- EIZO Monitor Dealer
- Microvitec Appointed Dealer
- NEC Appointed Dealer
- Panasonic Premier Dealer
- Roland Plotter Official Dealer
- Star Printer Sub Distributor
- Taxan Monitor Distributor
- 3M Media Premier Distributor

BBC SOFTWARE'S Popular Educational Software

Maths with a Story 1 (Disc). 4 primary level maths programs	£11.25
Maths with a Story 2 (Disc). 4 further maths programs.	£11.25
Picture Craft (Disc) 6-14 age group. Pack consists of flexible geometrical design & colouring programs.	£17.00
BONDING: Science (Disc) O-Level Chemistry program.	£20.00
ELECTROMAGNETIC SPECTRUM (8 Discs) O-Level program.	£20.00
ELECTRONICS IN ACTION (Disc) O-Level program.	£19.95
NEWTON & THE SPACE SHUTTLE (Disc) O-Level program.	£20.00
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Under 6 yrs – 8 programs on Discs, Shape Snap, Find the Mole, Teddy Count, Write a letter, Colour Train, Pick a Letter, Spell a Word & Teddy Bears Picnic. £12.00

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The Watford Speech Synthesiser is a very flexible speech synthesis unit based upon the powerful phonemes system. This system stores the building blocks of speech (called phonemes) and allows you to combine them quickly and easily to form virtually any word imaginable.

Supplied with an advanced ROM, you are provided with a 500 word dictionary to get you started. These can easily be added to by following the notes given in the comprehensive manual.

SPECIAL PRICE £32 (carr £3)

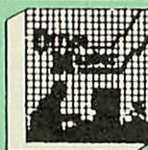
Continued→ → → → → → → → →

VIEW 3.0 ROM	**£45**
VIEW PROFESSIONAL	**£50**
VIEWSHEET (Acornsoft)	**£36**
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VIEWSPELL with 80 track disc	**£25**
VIEWPLOT Disc (Please specify for Master 128 or Compact)	**£20**
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CASHBOOK – A complete "Stand Alone" accounting software package for the cash based sole trader/partnership business. It is designed to replace your existing cashbook system and will provide you with a computerised system complete to trial balance.

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EASILEDGER – A management aid software tool designed to run alongside an existing accounting system. Essentially a Debit/Credit ledger system which can handle sales, purchase and nominal ledger routines to provide instant management information.

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All this for only **£21** (Disc)

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DATABASE – Set up a computerised card index system with powerful search facilities.

SPREADSHEET – Offers many calculation and editing features

BEEBPLOT – Provides visual representation from Spreadsheet data.

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MINI OFFICE II

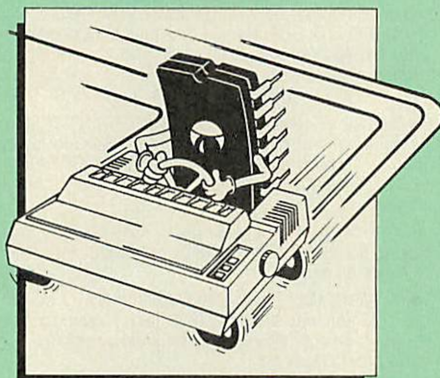
DISC Version for BBC B & B+	**£14.00**
DISC Version for BBC Master	**£16.00**
DISC Version for the Compact	**£18.00**

(When ordering please specify for which Micro & 40 or 80 track Disc)

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Advanced 1770 DFS Master	£28
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Advanced Control Panel	£28

VIEW PRINTER DRIVER ROM



View is a powerful word processor, but until now has seriously lacked in terms of printer support. With the launch of our Printer Driver ROM, which includes an extremely powerful and easy to use Printer Driver Generator, View users can find themselves in the realms of advanced word processing at only a small outlay.

The VPD extends View's printer command with a series of mnemonic commands. All standard highlight sequences are also supported. A large range of printers are supported by drivers contained within the ROM (the drivers can be downloaded and customised). Printers supported include: Epson's MX, RX, FX, LX, JX80 range, HI80, KP810/910, PW1080, JP101, HR15, M1009, GLP, Panasonic KX-P1081/2, JUKI 6100, etc.

Other printers are readily supported by defining a Printer Driver using the built-in Printer Driver Generator. The features mentioned below are available to both the built in Printer Drivers and user defined drivers (assuming the printer supports the features).

NLQ control, Underline, Bold, Proportional Spacing, Microspacing, Italic, Superscript, Subscript, Condensed, Enlarged, Double Strike, Set lines per inch numerically (e.g. LPI 6), Set characters per inch numerically (e.g. CPI 5), Select printer font, Select printer ribbon colour, Translation sequences, Emulation of BBC Character Set, Simple numeric expressions for certain operations, Full printer setup, Send control codes, Print prompt on screen, Redifinable Pad character, Pause for key press, Prompt to change daisywheel, and Execute ★ command when printing.

Other features include a very powerful on-screen preview, with bold, italic, underline, super/subscript, enlarged highlights, and a special printer driver to allow memory-based text to be previewed by View 1.4. Of course, View 1.4, 2.1 and 3.0 are all supported, as is Shadow RAM and 6502 Second Processors. The BBC B series and Master series of micros are supported. A comprehensive manual is supplied. All in all, a very professional product for the discerning user who wants power at their finger tips.

Price: Only £33

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Wordwise Plus	**£40**

Wordwise plus **£40**

We are giving away absolutely **FREE**, the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

Word-Aid

The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM has been personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
- Search and display in preview mode.
- Embedded command removal.
- Print Multiple copies of a document.
- Multiple file options for print and preview.
- Address finder.
- Label printer.
- Mail-merger.
- Number/delete/renumber.
- Clear test-segment area.
- BBC B, B+ and Master compatible.

Only **£24**

(N.B. Word Aid requires a Disc interface in your Micro)

BOOK The Complete Mouse User Guide to BBC Micro

This manual has been written to reveal the secrets of the mouse. It explains all the principles required by the hardware and associated software, and also example listings for inclusion into custom programs. The manual first details the basic principles of the mouse and a simple program which uses these principles. This information should be adequate for most applications. However, it is possible to improve the performance of the mouse by expanding on the principles already used in the software. This is again fully explained and an example program given.

It is possible to gain a full understanding of the mouse from this manual. For those not interested in exactly how the mouse functions, complete example programs are also included. These may be typed directly into the micro, without the need for any understanding of the hardware or software involved, enabling the mouse to be used for custom applications.

Price £5.95 (No VAT)

Example programs on Disc £4.95

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Archimedes BBC Basic Guide	£20
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View Guide (View 2.1)	£5.00
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Viewsheet User Guide	£10
Viewstore User Guide	£10
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Z88 Computing	£9.95
Z88 Magic	£14.95
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DOS – Programmers Ref. Manual 2nd Ed	£22.95
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THE COMPLETE BBC COMPUTER USER HANDBOOK

"Why has no-one written a book like this before? It's long overdue".
If you own a BBC-B, BBC B+, Electron, Master 128, Master Compact or Archimedes then this book is for you. It shows you how to get the most from your computer, and how to make the computer work for you. Although some sections are machine specific, most of the information, programs, hints and good solid experience are for the whole range of BBC machines. The general style and level means that both beginner and expert will feel satisfied with the quality and quantity of the material.

GENERAL – Uses and abuses of computers.

HARDWARE – How to design your own work station. Hardware additions (disc drives, ROMs, printers, 2nd processors, etc). DIY alterations.

HARDWARE RUNNING BBC-BASIC – All BBC machines are described with their differences. Compatibility between the various BBC machines. Networks. The Archimedes and its advantages.

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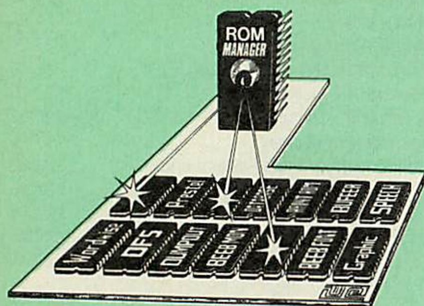
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Only: **£14.95** (Book No VAT)

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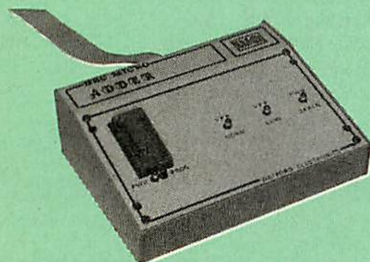
ROM MANAGER



Take control of your Sideways ROMs with ROM Manager. This powerful utility ROM gives you power over your sideways ROMs . Disable whole ROMs, send commands directly to named ROMs and many other powerful facilities.
"Provides comprehensive management of all your installed ROMs". (BEEBUG November '84.)

ONLY £20

ADDER



The only low cost EPROM Programmer for the BBC Micro that will program both the standard 21V and the new 12V5, 27128 EPROMS.
The Adder unit connects to the User Port and draws its power from there too. The EPROM is mounted in a top quality ZIF socket. There are no switches or controls as Adder is entirely software controlled.
The Adder software provides sophisticated facilities for programming EPROMs from a RAM image produced by loading disc files. The software is menu driven and designed for ease of use.

Features:

- Two ultra fast programming algorithms or standard slow algorithm.
- Supports standard 21V programming and newer 12.5 volt EPROMs. (Software switched).
- The RAM image to be programmed can be built up in many ways. Sections of image can be loaded separately. Part programming. Read EPROM. Edit data in memory.
- Automatic processing to handle a list of files to program into the EPROM.
- Automatic disc buffering to allow programming of 32K 27256 devices from a 32K file without extra effort.
- Verification gives detailed error list and checksums are maintained. There is also a blank check facility.
- Works with all standard filing systems. Generates header code for RFS ROMs to allow Basic programs etc. to be stored in EPROM. More than one file per ROM permitted.
- Programs the following EPROMs: 2516, 2716, 2532, 2732, 2764, 27128, & 27256.

£65 (£5 Carr)

TEX EPROM ERASERS

EPROMs need careful treatment if they are to survive their expected lifetime. Over erasure of EPROMs very rapidly turns them into ROMs!
The TEX erasers operate following the manufacturers specifications to give the maximum possible working life by not erasing too fast. We use these erasers for all our own erasing work.

- **ERASER EB** – Standard version erases up to 16 chips. **£28** (carr £3)
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- Spare UV tubes. **£12**

Servisol Foam Cleaner

This 415MI, king size multi-purpose foam cleaner spray is ideal for cleaning the Keyboard, Monitor, Disc Drive and your computer furniture surfaces. Simply spray on the surface to clean and wipe off with a clean cloth.

£2.50

Antistatic Aerosol Spray

Ideal for cleaning and preventing static build-up on TV/ Monitor Screens.

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Aerosol Dust Spray

This simple to use aerosol spray is ideal for removing Dust and Dirt deposits from the Keyboards and similar inaccessible places. **£3**

SPARES for BBC Micro

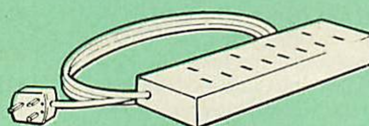
BBC Keyboard	£46	Speaker	£3
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Speaker Grill	£1	17.734 MHz Xtal	£2
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Fitted in place of your normal mains plug, this device protects your equipment (and data from corruption), against mains high voltage translent spikes/surges caused by lightening or thermostats switching.

Protection for only **£8.50**

4 Way Mains Distribution Socket



4 way top quality mains trailing sockets.
Supplied wired up with mains plug ready for use.
Can be screwed to floor or wall if required.
Very useful for tidying up all the mains leads from your peripherals.

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A 4 way mains distribution unit as above with a built-in Surge Arrester, providing protection for your complete Computer/Hi-Fi System

£13.50 (carr, £1.50)

ROM Extraction Tool

This extremely useful tool allows you trouble free chip insertion and removal from your comouter by distributing the removal force over the whole body of any 24 or 28 pin chip. **£2**
Metal Chip Extractor **£3**

28pin DIL HEADER PLUG

SOLDER type **£1.50** IDC CRIMP type **£1.95**

8 WAY DIP SWITCH

Increase the speed of your Disc Drives by soldering this switch to your BBC B or B+ keyboard

Only **£1.00**

28 pin ZIF SOCKET (Textool) **£6.95**

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(All ready made and tested)

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Supply from BBC power supply to standard Disc Drive Connection: Single **£3.00**; Dual **£3.75**

DISC DRIVE INTERFACE LEADS
BBC to Disc Drives Ribbon Cable
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ECONET (5 pin DIN)	35p	50p
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Disc Drive Plug 4 way	100p	–
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Watford DATA DUCK

Convert two single Disc Drives into one Dual Drive with this simple external unit (Suitable for Disc Drives with PSU. For Disc Drives without PSU, you will also require Watford Power Duck, see below).

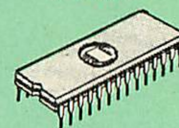
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Watford POWER DUCK **£8**

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SAA5050	£8.75
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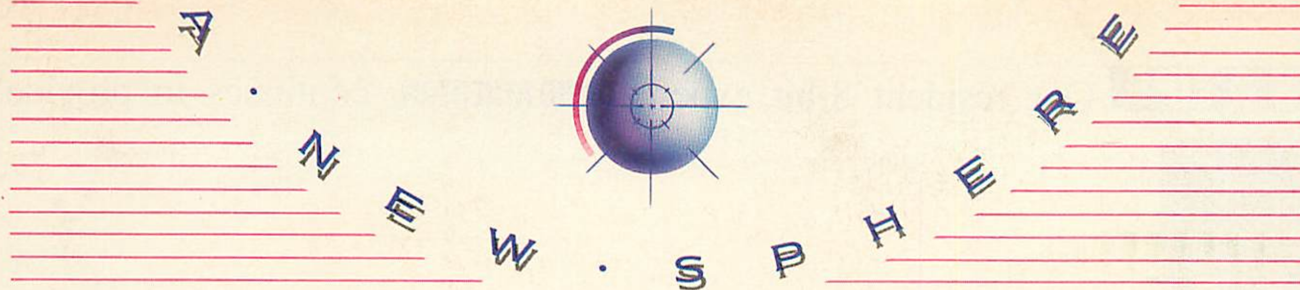
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EIGHT BITS

£5 REPEAT LAST COMMAND

Over the last year or so, we have featured quite a few utilities that give the BBC micro useful extra features that are found on other machines. This month Michael Brown from Cambridge has sent a program which emulates a very useful feature in MS-Dos.

On a PC, pressing the f3 key repeats the last command that you typed. This is very useful if you type a long command, and accidentally omit or mistype something near the end. Michael's program offers a similar feature from the Basic prompt, using the TAB key

REPEAT REPEAT

Its best use is for when you type in a short FOR-NEXT loop or similar command to try something out, and then wish to repeat it. Other commands which need frequent repeats are LIST, *CAT and RUN.

Type in or load the yellow pages listing, and run it. The program is now active. Then carry on typing things as normal, but at any time, if you wish to repeat the last command typed, just press the TAB key. The command will reappear on the command line, and you just press RETURN again. If you want to alter the line at all, simply use the editing keys as usual. To switch off the feature, type *FX13,2 and to switch it on again, type *FX14,2. Pressing BREAK or CTRL-BREAK will remove the feature and the yellow pages program has to be rerun to obtain the effect again.

The program works by using the 'character entering buffer' event to trap RETURN being pressed. When RETURN is pressed, the contents of the Basic input buffer at memory address &700 are transferred to memory address &970.

This is because Basic converts its commands to key values and replaces the typed command at &700 with the key value which wouldn't be of much use to you if you wanted to repeat the command. Incidentally, if you enter a Basic key value (for example &F9 for RUN) into the keyboard buffer, the command still executes but doesn't appear on screen.

The routine also traps TAB being pressed, and if it is pressed, it simply discards the tab character, and enters the characters stored at &970 into the keyboard buffer, which makes the last command appear on screen.

Note that the program only works from Basic and other languages which use memory address &700 for their input buffer. To make the program work in other languages, you will have to discover the input buffer address for that language, and alter the value of 'buffer' at the start of the program

Note that *View*, which uses an input buffer at &500, will still not function correctly with this program as *View* behaves rather unusually when entering text into the input buffer.

Other values in the program can be changed. For example, the code can be run at a different free page of memory by changing the value of CODE%.

A different key can be used to recall the stored command by changing the value of TABKEY, both set near the start of the program.

£5 INTERSHEET LABELS

Boz Perryman of Birmingham is an *Intersheet* user, and one thing he finds very annoying is the requirement by *Intersheet* to type a " symbol in front of an entry to define it as a label, unlike, say, *Ultracalc* and *Viewsheet*, both of which automatically assume something is a label if they cannot make sense of it as a formula, reserving the " operator when a valid value is being forced to be a label, for example, "28-5-1990. If you try to type ordinary text into a cell, you get a 'No such label' or 'Syntax error' message.

This happens so often that Boz has written a program to get round it. The program in the yellow pages should be typed in or run and a machine code file called COMMAS will be created on disc.

This should be run from the *Intersheet* front menu, by typing *COMMAS. Once installed, every time you start to type ordinary text on the top line, the first character is preceded by a " sign. The only exception to this is if you type a "/" sign to signify a command.

The program is especially useful when entering a long list of names down a column or a title across a number of columns

using the step-down and step-right facilities. Once installed, the effect can be toggled on and off by pressing CTRL-@.

Everything else seems to work normally as far as Boz can tell, except that for some reason when you issue two star commands in succession from *Intersheet* with the COMMAS routine installed, any printout from the first command is aborted as soon as you type the second '*'. This of course can be avoided by using the CTRL-@ toggle to turn off the feature before issuing star commands.

The program works by intercepting the 'key pressed' event, and if a key other than RETURN, DELETE or CTRL-U is pressed, a " character (Ascii 34) is inserted into the input buffer followed by the character typed. A flag is then set to stop this happening again. When CTRL-U or RETURN is pressed to delete a line or to start a new line, the flag is reset and the effect is reinstated.

An overriding flag is toggled if the key pressed is ASCII 0 (CTRL-@), and because it uses the 'key pressed' event, it can also be turned off with *FX13,2 and on again with *FX14,2.

The program uses half of page &A (or elsewhere if you wish), but no zero page locations. It also works from Basic and most other applications, but of course, it is rather more annoying than useful in these other programs!

£5 ADFS DISC DISCOVERY

David Flannagan from Hyde found our program last year which mended ADFS directories to be useful, and has written to point out that another serious error which sometimes occurs and is very difficult to overcome is 'Bad FS Map'.

This error makes the whole disc unreadable, meaning that sector editors and other utility tools cannot read the disc at all, irrespective of whether directories and files are corrupt. ADFS actually only needs the free space map for write operations, although a bad map forces both reading and writing to fail.

David has exploited this by writing a program which creates a 'fake' free space map, which will then allow you to access the disc, and transfer all the files on to another disc. The original disc with the error can then be reformatted.

The program writes an empty free space map (meaning a full disc) to sectors 0 and 1 of any ADFS disc, so that *MAP and *FREE list no free space at all.

Loading from the disc is then possible, but attempting to write will give 'Disc full'.

The excellent DIRCOPY on the Master Welcome disc can be used to copy the $ directory and all its subdirectories to another disc. This is slow, but if you have dual disc drives, you can leave the computer and do something else.

Do not attempt to use BACKUP to copy the disc, as this will copy the 'fake' free space map as well, and you will still not be able to write to the disc.

To use the program, type in the yellow pages listing, and save it on a good disc. When you get a 'Bad Free Space Map' error, load in the program from a good disc.

Then reselect ADFS (*ADFS) and try to *MOUNT the affected disc – be sure you do this if you have more than one drive, otherwise another *MOUNTed disc (perhaps a hard disc!) could be affected. Don't worry about any errors which may appear.

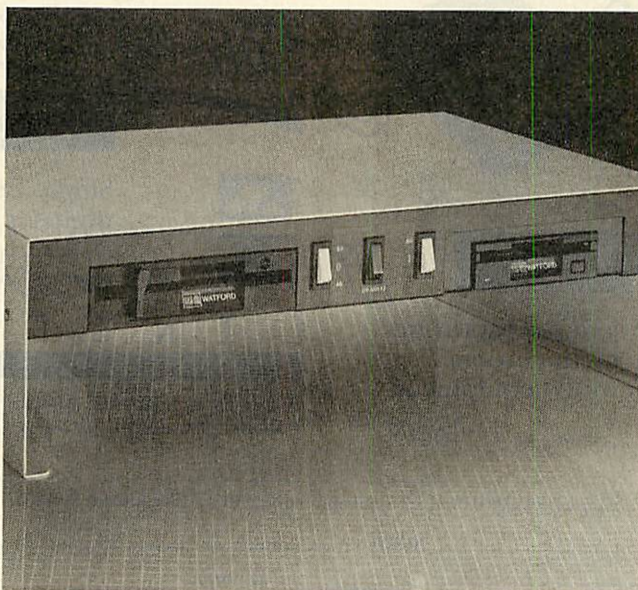
Run the program, and it will first ask you to enter the size of the disc, S, M or L.

These options are the same as the formatting options when you first created the disc – S for 40-track single-sided, M for 80-track single-sided, and L for 80-track double-sided.

If you aren't sure, type L, as it isn't particularly important as long as you are only going to copy the software off the disc, rather than using VERIFY or BACKUP, or trying to keep the disc with the full map.

A valid free space map will then be written back to the corrupt disc, and you will be able to use it as normal, with the exception that no further files may be written to the disc because it is 'full' according to the free space map.

This program is written for the BBC and Electron, but should also work on the Archimedes for L and D format discs. The program doesn't seem to work on Archimedes E format discs, which is not at all surprising as these use a different disc layout.



£5 MACHINE CODE SQUARE ROOTS

Mr M Peters of Blandford has been following the recent discussions in *BBC Acorn User* about methods of calculating square roots, and points out that the square root of a number may be calculated when one sums a sequence of n odd numbers.

The result gives n squared, thus the five consecutive odd numbers 1+3+5+7+9 gives 25, 5 squared, and the 12 consecutive numbers 1+3+5...17+19+21 +23 gives 12 squared, or 144.

To find the integer part of a square root therefore, all one has to do is sum the odd numbers, counting them as you do until the required number which you are seeking the root of is reached or exceeded.

The answer is the total number of odd numbers, minus one if the chosen number is exceeded. In this case the accurate root is not an integer.

Alternatively, one can start with the chosen number and subtract the odd numbers until the result is zero or less.

Mr Peters has enclosed a brief program which will do this in Basic, which is:

```
INPUT number
root=Ø
odd=1
total=Ø
REPEAT
total=total+odd
odd=odd+2
root=root+1
UNTIL total>=number
PRINT "Integer square
root=' root-1
```

As it stands the program is not terribly useful. Mr Peters admits this, pointing out, that there is a perfectly good SQR function in the Basic Rom which will do the work more quickly and accurately.

I thought about this, and of course, there is one instance

where the SQR function is no use, which is in machine code programming.

If you require a square root in the middle of a machine code routine, you cannot easily access the Basic Rom.

You will however, probably only require the root for graphics plotting (for example when plotting a curve) and so a machine code implementation of the above algorithm would be both very short and also extremely useful.

Accordingly I decided to write one, and you will find my program set out in the yellow pages of thiss issue. The routine can easily be incorporated into your own code.

It only occupies 60 bytes of machine code, and it uses seven zero page variables, with no use whatsoever of the X and Y registers.

It is therefore extremely useful for inclusion in other programs. The program only works on 16-bit numbers (0-65535) and will calculate the integer part of the square root of any number between 0 and 65025 (255*255).

To use it, the 16-bit value of which you wish to calculate the square root is placed in the location 'INPUT' in the normal lo-hi format, and the routine is called.

No other initialisation is required. The result, which is an 8-bit number, is placed in the memory location 'COUNTER'. The square root of a 16-bit number must of course always be only an 8-bit number.

The routine could easily be altered to return this value in, say, the accumulator, merely by inserting the instruction 'LDA COUNTER' before the final RTS.

I have altered the algorithm very slightly to report the correct result when an exact square is tested.

This is done by omitting the final 'DEC counter' instruction (matching the algorithm's instruction to deduct one from the total) when the running total and the original number exactly match – see the 'BEQ end2' instruction near the end of the program.

Otherwise the program is an exact machine code implementation of the Basic algorithm above.

Notice how the program would be much longer if we had to work with 24-bit or 32-bit numbers.

Basic itself works with 40-bit floating point numbers in the SQR command.

And running a few timing tests with this routine as against the Rom command (admittedly using the Master Compact Basic 40 which contains the high-speed floating point operations), show that the Basic Rom is actually much faster, showing once again the amazing skill of Acorn.

£10 STOP PRESS TIPS

Jeremy Solly from Chandlers Ford, a regular contributor to this column, has written to us with a collection of tips for *StopPress* users.

First of all, spooled graphics files. Readers of this magazine must be familiar with this type of file, where graphics are spooled to disc, by setting up a spool file before they are drawn to screen, ie:

```
*SPOOL filename
FOR A=1 TO 100
GCOL 0,RND PLOT
85,RND(1280),RND(1024)
NEXT
```

AMX StopPress can load in spooled graphics files. First of all, create the files in the 'S' directory, ie S.SPFILE.

Once the screen is showing an empty part of a page, click the page icon on the right of the screen (indicator of the position of the page) and you will be

presented with a menu. Click '3D Zicon' and you will see yet another menu. Click 'Load' and type in the name of the spooled file. You should not type the 'S.' directory prefix.

The spooled file should now have been drawn. When the original was drawn it was probably in a window the size of the whole screen. The *StopPress* window is smaller, but the graphics only appear inside the window.

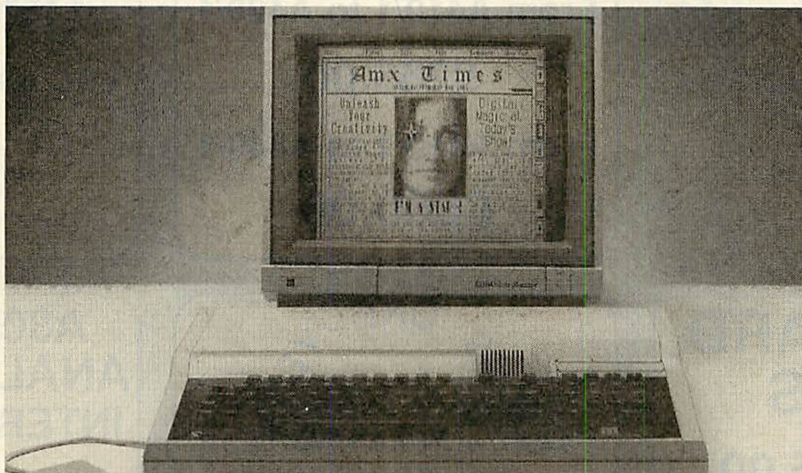
Many *StopPress* users will have noticed that justified text has extra spaces inserted between words to pad out lines to the width of the window.

This method, the only option with a character-based word-processor, could be better in *StopPress* as each character is in a graphics grid (1279x1023) rather than in a text grid (80x31). Instead of inserting whole spaces, a space a fraction of the size could be used, therefore making evenly spaced gaps all along the line.

This is implemented in *StopPress* but is well hidden. Follow the same route through the menus as in the spooled graphics example above, but instead of choosing '3D Zicon', choose 'u-Justify'. Type some text, and you will see that it is much more evenly justified and a lot nicer to look at.

It has been mentioned in some articles about *StopPress* that cut-outs can only be stretched by twice or a half times the original size. This is wrong – cut-outs can be stretched to any size. You must deselect the 'Same' option on the menu, and not select the 2x or 1/2x options.

Define the box around the area to be stretched and you will be prompted to make another box into which the original is scaled to fit.



Thank you, Jeremy, for that marathon collection of tips.

If you have any hints or tips for the Eight Bits column, particularly in the applications area, write to David Atherton, Eight Bits, BBC Acorn User, *20-26 Brunswick Place, London N1 6DJ, enclosing your contribution in both disc (any format) and paper form. Please include your text as well as any program on the disc.*

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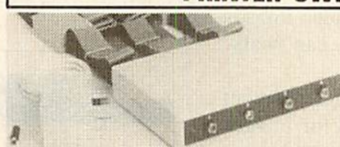




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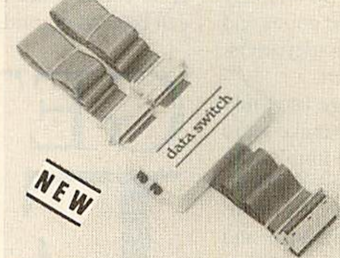
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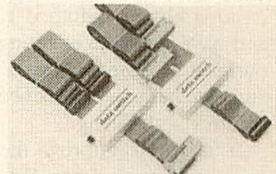


This quality switch box is designed for the Archimedes / A3000 range of computers and IBM PC compatibles. The ribbon cables supplied are 2 x 1.5m + 0.4m to the printer. The unit can also be used with a parallel plotter.

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These useful switch boxes are ideal for use in the office or at school. No need to keep swapping cables over just press the button! The cables supplied are 2 x 1.7m + 0.4m with appropiate connectors fitted. Both version may be used with a plotter if required. Super value.

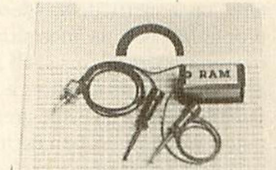
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GETTING THE EDGE

DAVID KNELL explains how image processing power can help to get the best out of high-resolution pictures



The graphical ability of personal computers has improved dramatically over a very few years. When the original BBC micro appeared in 1982, it was hailed for its graphics facilities.

It could display a screen of 640x256 dots in black and white, or 160x256 dots in eight colours.

Nowadays, seven years later, the Archimedes will display 1152x896 dots in black and white or 640x512 dots in 256 colours. There's been a corresponding increase in graphic applications for personal computers, culminating in, for example, sophisticated CAD systems of the sort only available on mainframes with specialised graphics terminals a few years ago.

We also encounter ray-tracing packages for the generation of life-like images which were research projects until recently and, of course, windowed operating systems like Risc OS. These applications can be split into three areas: image generation, image processing and image analysis.

Image generation involves producing images by computer. Computer art is one area where image generation is used – to generate anything from a picture of part of the Mandelbrot set to a ray-traced image of a bowl of fruit. It is used in flight simulators to generate fast-moving, real-time images of the landscape the simulated aeroplane is flying over.

CAD systems use it to produce images of the user's design so that they can 'walk' round it.

Image processing or image enhancement is used to improve the quality of images presented to the computer, or to make them more useful. Images may be sharpened to remove blurs, smoothed to remove noise and have their edges brought out to make outlines of shapes clearer. Colour can be added to help distinguish between different features in the image.

It is used to improve the quality of pictures sent back from Saturn, to identify possible defects in manufactured goods and to enhance X-rays so that previously invisible features may be clearly seen.

Image analysis takes an image (possibly after processing) and attempts to make sense of it. This can include 'count the blob' problems such as counting the colonies of bacteria on a petri dish, 'describe the blob' problems such as measuring its size and recognition problems such as interpreting a picture of a map to select a route from A to B. Image analysis is the area in which computers lag furthest behind humans.

In this series, these areas will be considered in turn.

But before diving into the murky realms of image processing, there are a few fundamental concepts to be considered.

Image fundamentals

Pictures (commonly known as images) are usually held as discrete points when stored on a computer, each of which gives the colour of a small area of the image. These pixels (short for picture elements) are usually arranged in a rectangular grid.

This representation of pictures brings problems, such as aliasing. Consider the problem of trying to draw a line at a small angle to the horizontal, as shown in figure 1. Using the pixel grid shown and setting a pixel to black if it is more than half-filled by the line, the line displayed does not look smooth, but rather like a line with a step in the centre. Anti-aliasing uses shades of grey between black and white to smooth the edge of the line, by setting each pixel to a grey level calculated from the amount of black in it. A pixel which is half-filled by the line would be set to a grey level midway between black and white. Anti-aliasing is used by the font manager on the Archimedes to improve the look of the characters displayed.

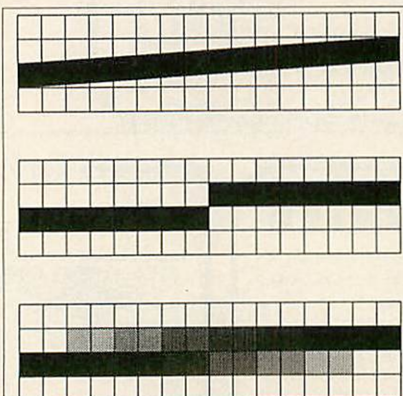


Fig 1. Drawing an angled line

Moire patterns occur if the image being presented contains closely-spaced lines and the size of a pixel is close to the distance between lines. This results in an image with 'waves' of black and white on it if the colour of a pixel is calculated as the colour at its centre – see figure 2. These patterns can be seen on bridges while driving down

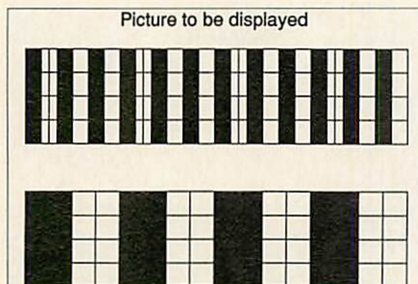


Fig 2. Black and white 'waves'

the motorway – watch the supports for the rail along the edge and see the patterns formed as the holes in the front coincide alternately with the posts and the holes in the rear. They can be eliminated by anti-aliasing – alternatively, they can be used to produce computer art! Try this short routine to see how easily Moire patterns can be generated.

Simple image operations

Suppose we've got an image captured which is 'noisy' – there are random variations in the intensity of each pixel from its true level. To reduce this noise, we could produce another image in which the level of each pixel is computed as being the level of the corresponding pixel in the noisy image averaged with those of its neighbours. Alternatively, if this smoothed the image too much, the central pixel could be weighted more than its neighbours: we could calculate the sum (4*central pixel + left + right + up + down) which would not smooth the image so much as a straight averaging, but would tend to lose less detail.

If the original averaging did not smooth the image enough, we could try averaging a 5x5 block of pixels, possibly weighting them as above. If this still is not enough, the size of the block can be increased as required.

Suppose instead that we want to pick out horizontal edges from an image. This time, instead of averaging the pixels in a 3x3 block, we could subtract the average grey level of the three pixels immediately below the central one from the average of the pixels immediately above the central one. This would give an image where pixels in a region of constant colour or pixels lying on vertical edges took the value 0, whilst those on horizontal edges took values progressively further from 0 as the

Kernel to detect horizontal edges

1	1	1
0	0	0
-1	-1	-1

Kernel for averaging

0	1	0
1	4	1
0	1	0

Fig 3. Smoothing and edge detecting

strength of the edge increased.

These two operations are both examples of convolution – the name given to the process of adding the values of pixels, possibly weighted, in a small area of an image to give the value of a single pixel in an output image. The set of weights used is called the kernel, and the kernels for the smoothing and edge-detecting operators are shown in figure 3.

There are a couple of problems to be sorted out. The first of these is that applying either of the kernels shown on an image will produce pixels whose values do not fall within the range of the pixels in the original image. The averaging kernel may produce pixels with values up to 8x the peak value in the input image, and the horizontal edge-detector may produce pixels with values between -3x and +3x the peak value.

In order to solve this problem, the output of the kernel is usually shifted and compressed to fit into the same range as the input.

This can be done by specifying two additional parameters – a quantity to add and a quantity to divide by. In the case of the averaging kernel these would be 0 and 8 respectively and for the edge-detector, 3P and 6, where P is the number of grey levels per pixel in the input image.

Alternatively, or in addition, the absolute value of the output of the kernel may be taken and this may then be scaled.

Taking the absolute value of the output of the edge-detecting kernel would give an operator which did not distinguish between black-to-white horizontal edges and white-to-black edges.

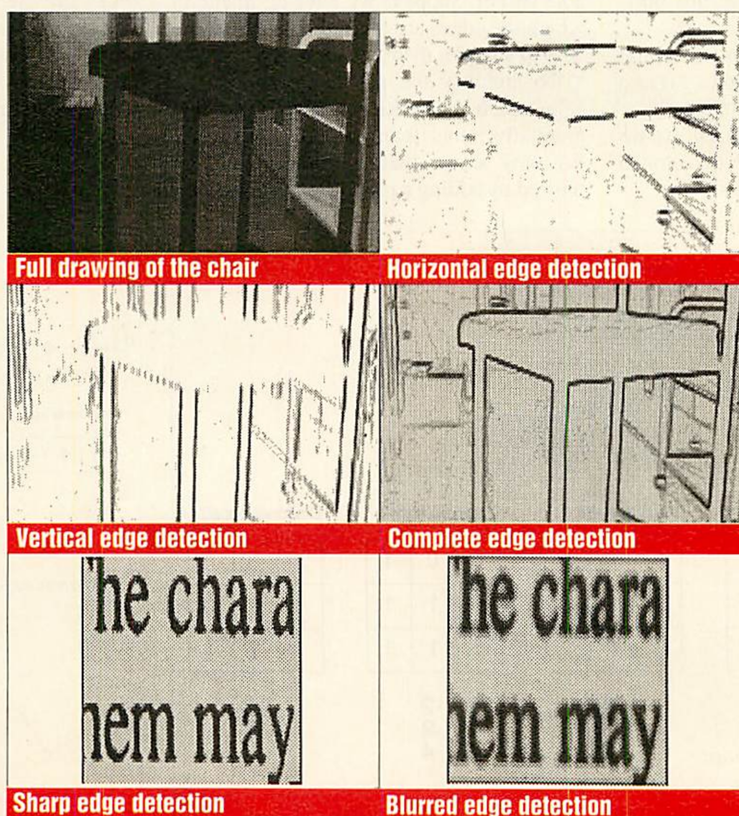
The second problem is that favourite bugbear, edge effects. We cannot directly apply a 3x3 kernel to pixels on the edge of an image as these pixels do not have all of the requisite neighbours.

There are a number of courses of action possible, such as just setting these pixels in the output image to zero or applying the part of the kernel which falls on real pixels. Which is better depends on the image being processed and the type of subsequent processing which is envisaged – however, any process which takes notice of such pixels is inherently suspect.

Implementing a routine to perform convolution operations is reasonably straightforward. Accompanying this article is a listing of a routine to perform operations with a kernel of size 3x3, which is sufficient for many operations.

The routine provided has, in addition to the features outlined above, the ability to perform the convolution 'in place' – the output image may well occupy the same space as the input one.

Such a routine cannot just read pixels from the input image and write them to the output image as it pleases, as the convolution is specified as acting as if it were applied to every point in the image simulta-



Full drawing of the chair · Horizontal edge detection · Vertical edge detection · Complete edge detection · Sharp edge detection · Blurred edge detection

0	1	0
0	0	0
0	0	0

Fig 4. Moving the image down one pixel

neously. Consider the kernel shown in figure 4, which should result in the whole image being moved down one pixel.

If this were to be applied sequentially to an image from top to bottom, the image would end up composed entirely of copies of the top line.

In order to overcome this problem, the routine maintains a scrolling window on the image, which covers the three lines currently being looked at. Before a line is processed, the line below that in the image is copied into the bottom line of the buffer and the other two lines in the buffer are moved up one. Now the convolution can take place, with the input to the kernel being taken from the buffer and the output being written directly back to the image.

Deriving kernels

Now that we can convolute, how do we derive useful kernels to use? One way is to alter kernels which already exist. Suppose a kernel to detect all edges, not just horizontal ones, is required.

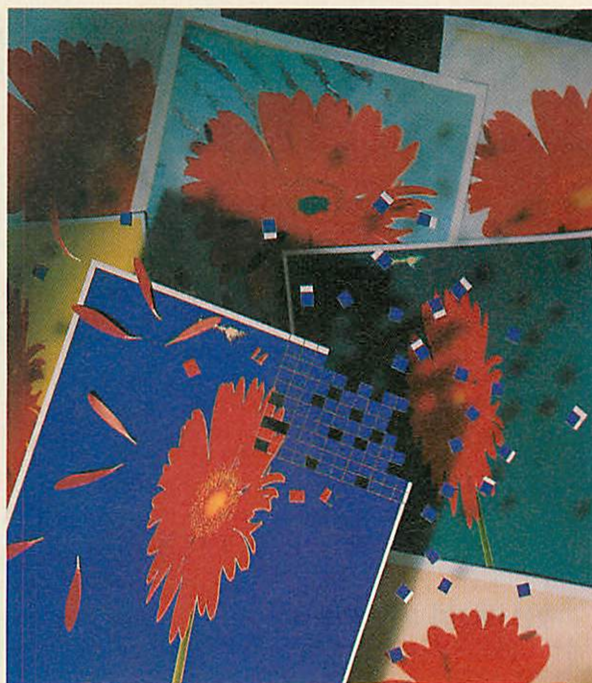
Firstly, turning the kernel for horizontal edge detection through 90 degrees gives a kernel which will detect vertical edges. Now we want one to detect all edges, so we simply add the horizontal edge detector to the vertical one as in figure 5.

This nearly works, but not quite: as shown in the diagram, one orientation of diagonal edge will not be detected. The problem here is that the horizontal and vertical edge detecting parts of the kernel produce outputs of opposite signs, which then sum to produce an output of zero.

There are various ways to fix this: if the horizontal and vertical edge detectors are applied separately to produce a pair of images, then these images can be combined to produce an image containing all of the edges in the original. The absolute values of pairs of pixels from the two images can be summed; a better method is to take the vector sum of corresponding pairs of pixels (meaning that the output would be SQR(H*H + V*V)).

But what if it is not possible to derive a suitable kernel by such means? A little bit of inspired guesswork will often provide the answer, although the initial guess may take a little refining before the desired results are obtained. Alternatively, take a look at the problem and attempt to derive a suitable kernel. Suppose we have an image in which the edges are blurred, and it is desirable to sharpen them.

To simplify the problem, examine an edge which is blurred. It changes grey level gradually rather than suddenly (figure 6). We saw above that an image could be blurred by adding a proportion of surrounding pixels to each pixel in the image, so possibly this process could be reversed by subtracting instead of adding. Figure 6 shows the development of a kernel to sharpen edges as a combination of an 'inverted' blurring kernel and a kernel to pass some of the original image through. Note that the resulting 'sharpened' edge is only steeper than the blurred edge, not any narrower. This, however, quite successfully tricks the eye into seeing a clearer image. The 'before' and 'after' images of scanned (and blurred) text before and after sharpening show the results which can be obtained with this method.



Kernel to detect vertical edges

1	0	-1
1	0	-1
1	0	-1

Kernel to detect edges in general

2	1	0
1	0	-1
0	-1	-2

Horizontal edge

0	0	0
1	1	1
1	1	1

Vertical edge

0	1	1
0	1	1
0	1	1

Diagonal edge

0	0	1
0	1	1
1	1	1

Diagonal edge2

1	0	0
1	1	0
1	1	1

	Horizontal edge	Vertical edge	Diagonal edge	Diagonal edge2
H detector output	-3	0	-2	-2
V detector output	0	-3	-2	2
H+V detector output	-3	-3	-4	

Fig 5. To detect all edges, simply add horizonal edge detector to the vertical one

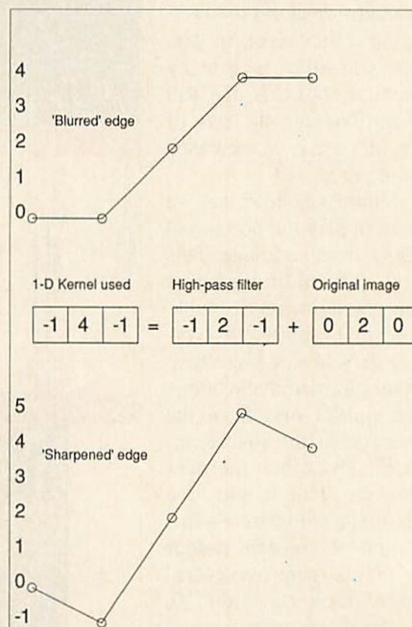


Fig 6. Blurred edges change gradually

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The Archimedes' desktop isn't guaranteed to keep track of every single little file. Enter **DAVE ACTON** with FileFinder, the program that lets you keep track of everything

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FileFinder is, as you might guess, a Risc OS application for the Archimedes. It lets you search any directory tree and displays the results in one of a variety of formats. You can look for specific file types or filenames that match a given string. So, if you've lost a text file which you think had the letters 'CAT' in the name somewhere, *FileFinder* will dig it out. It can also greatly speed up the process of running files many levels down the directory tree.

There are two listings in the yellow pages. Listing 1 (MakeApp) creates files used by the application (sprites, templates and so on). Listing 2 (!RunImage) is the main program. Create a directory called !FileFind in a suitable place, for example, the root directory on your hard disc. Run listing 1 (MakeApp) and enter the full pathname of the directory you have created (a sensible default name is provided). The necessary support files will be created. These are:

!Boot – run when the parent directory is catalogued. It ensures the *FileFinder* sprite is included in the desktop's pool of sprites.

!Run – run when the application is double-clicked. This runs the main program !RunImage after ensuring there is enough memory free to do so.

Templates – the *FileFinder* template file. This contains the definitions for the three windows used by *FileFinder*.

!Sprites – the sprite file containing the *FileFinder* logo.

Now save listing 2 in the directory as !RunImage. The application is ready to use – just enter the desktop and double-click on the !FileFind directory. The *FileFinder* icon will appear on the icon bar.

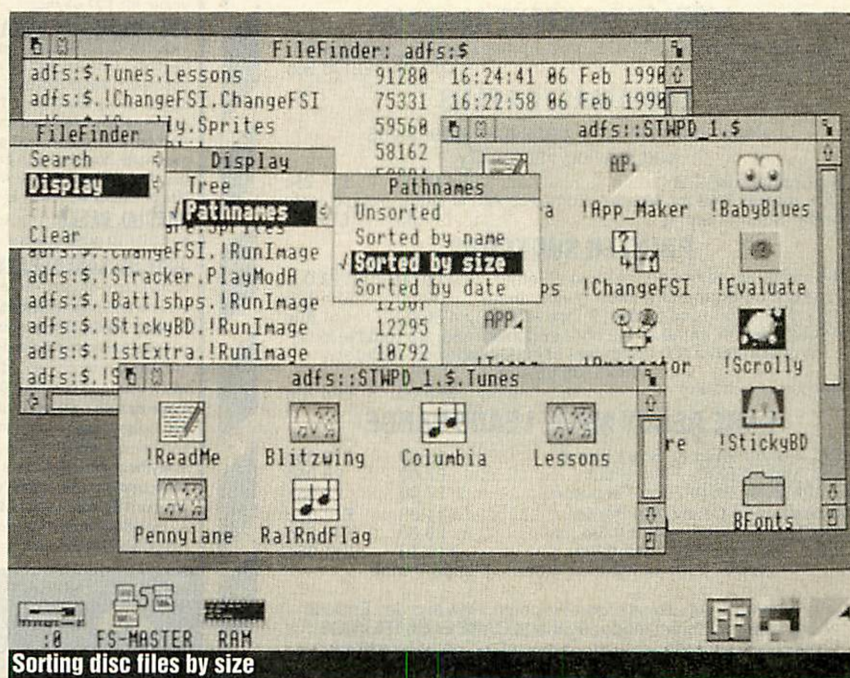
To activate the application, click on the *FileFinder* icon. A window will appear with the title 'FileFinder' and containing the words 'No files'. Pull up the *FileFinder* menu by clicking on this window with Menu (the middle mouse button).

The first option, Search, leads to a submenu. The first entry on the Search submenu is the directory to be examined. The default is $ (and this will be the root directory of the default drive of the default filing system). Enter a directory name here and wait while the tree is searched. When the search is complete, all files found will be shown in the *FileFinder* window. If you want to look on a particular drive, or filing system then include this in the pathname – adfs::4.$.Fred for example.

The second entry on the Search sub-menu leads to the Match sub-menu. Enter on this any wildcarded name you want the application to use when searching. The default is * which will match all files encountered. To look for all files with an 'a' in them you would enter *a*, go back to the Search menu, enter the directory name and press RETURN. For convenience, the Match string is remembered if you close the menus.

The File type sub-menu is used when searching for files of a particular type (for example, Sprite files or Text files). To look for all files click on All and a tick will appear beside it. Otherwise, go to the Named type menu and click on the desired type. This will not affect any tree currently being displayed, only which files will be included in the next search.

The Display option leads to a sub-menu concerning the display of the files found. The default is Tree which causes the files to be shown in a tree-like format. You can however show the files as full pathnames (with size and time-stamp) in one of four ways. The Unsorted option presents the files in the order they appear in the tree. Sorted by name arranges the files alphabetically



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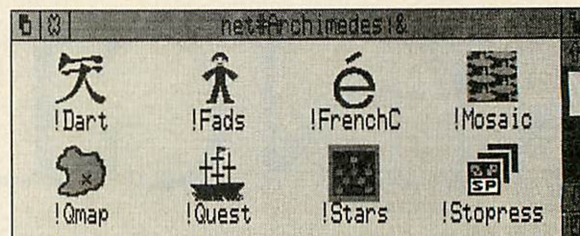
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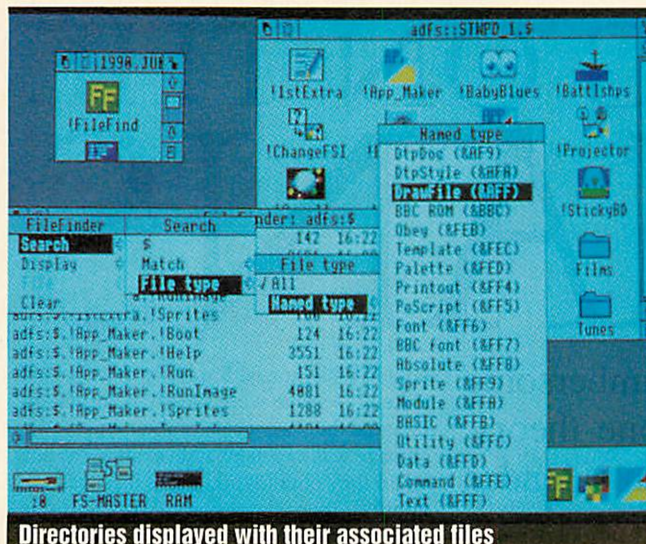
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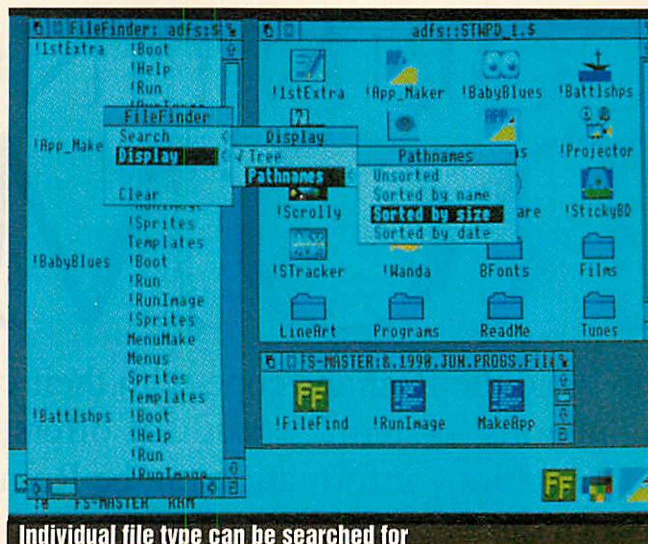
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Directories displayed with their associated files



Individual file type can be searched for

according to their individual filenames (and irrespective of their place in the tree). The other two options are self-evident.

The File option is activated by selecting a file shown in the window. Just click on a filename with Select or Adjust and then pull up the File sub-menu. The Info window contains details of the selected file, including file type (if any). Click on Open parent to open the directory viewer containing the selected file. You can also run a file directly by double-clicking on its name in the *FileFinder* window.

The final option is Clear which discards the current tree. Closing the *FileFinder* window has the same effect. To quit the application, click on the *FileFinder* icon with Menu and select Quit.

How it works

The 'polling loop' is near the beginning, using the Wimp_Poll command to find out what needs to be done next. PROCredraw is responsible for updating the main window, PROCcheckmouse deals with all relevant clicks of mouse buttons and PROCmenuselect sorts out all menu choices.

The easiest way to arrange the information found by searching a directory tree would be to store each filename in full, followed by its details (size, type, date and so on) but because large numbers of files may be found this would be very wasteful in memory terms. Instead, a tree is built up (tree%) so that full pathnames can be found without storing each of them.

A separate table (filedat%) contains file sizes and other details. So that files can be shown in order of size, date or whatever, each file entry in filedat% has a 'position' field which indicates where it should actually be displayed. Table 1 shows the tree format used by the program and table 2 describes how information in the filedat% table is arranged.

So that memory usage is kept to a minimum, a flexible heap is used. PROCinitheap sets this up. Functions FNgetablock and FNextendablock create or extend areas of workspace respectively and, if necessary, use the Wimp_SlotSize SYS call to grab more memory from the communal pool.

The tree is built up by PROCbuildtree which in turn calls FNdoobj. The technique used is a standard recursive one, but there is one problem with this particular application that deserves a mention. When looking selectively for files, not all branches will yield results. Some will be empty of the objects we are looking for and these should be ignored. However, if a file *is* found several levels down the directory tree, all of the directories directly above that file should be included.

In other words, the deeper levels of the tree need to tell those levels above whether the search down those particular branches has been successful or not. If not, the branches are irrelevant and can be cut out. We manage this as follows...

At the start of FNdoobj the local variable wasfiles% is set to the value of the global variable files% – the number of matches found so far. If, at the end of this invocation of FNdoobj wasfiles%=files% you know that the branches beyond do not yield 'fruit' and so may be lopped off. In fact, the memory used is freed again with FNfreeablock. FNdoobj passes back up the tree either the address of a directory structure (if files were found down that path) or -1 (if not).

The displaying of the tree is done by a piece of machine code called showtree. This plods through the tree recursively, displaying the files in the appropriate place. The register select (R5 or F% in Basic) contains the currently selected file in the bottom three bytes and two flags in bits 30 and 31. If bit 31 is set, the files are to be shown as full pathnames and not as a tree.

Also, they will be shown according to their sorted positions and not merely as they come. If bit 30 is set, the files are not shown at all. This merely locates details about the selected file. On exit, R0 points to a position in the filedat% table where the details of the specified file can be found. Also, the full pathname of that file can be found at fullpath.

The sorting of files by size, date and so on is performed by PROCsort using the programmer's best friend OS_HeapSort. Firstly, a table (tab%) is created, containing pointers to each of the entries in the filedat% table.

Then OS_HeapSort is called with R2 containing the type of sort to be performed. When sorting by name, 4 is used. The sorting of files by size and date is down to a couple of user routines and so the addresses of these are passed in R2.

User routines are entered with R0 and R1 pointing to two entries being compared. The routine .comparelen is the simplest example. The length words are loaded into R2 and R3 (which may safely be used by user comparison routines) and compared in the usual way.

Table 1 – format of tree%

Word 0	-address of directory name (null teminated)
Word 1	-object type (directory=2)
Word 2	-number of items in this directory
Word 3	-first item is a file and lower bytes contain file number (as used in filedat% table). Otherwise item is a directory and word contains the address.
Word 4,5...	-next items

Table 2 – format of filedat%

Each file has its own entry of a fixed length:

Word 0-2	-filename (null teminated)
Word 3	-load address
Word 4	-execution address
Word 5	-size
Word 6	-position (used in sorting)

COUNTING ON THE ROMANS

How did the Romans cope with their cumbersome numbering system? **MICHAEL LEETE** offers one theory, adding a little information on the Roman calendar

The legacies of the grandeur that was Rome pervade the whole of western Europe. Many cities and the roads that link them arose from Roman foundations. Our languages contain great chunks of Latin vocabulary and our calendar and most weights and measures, prior to metrication, derived from the Roman systems.

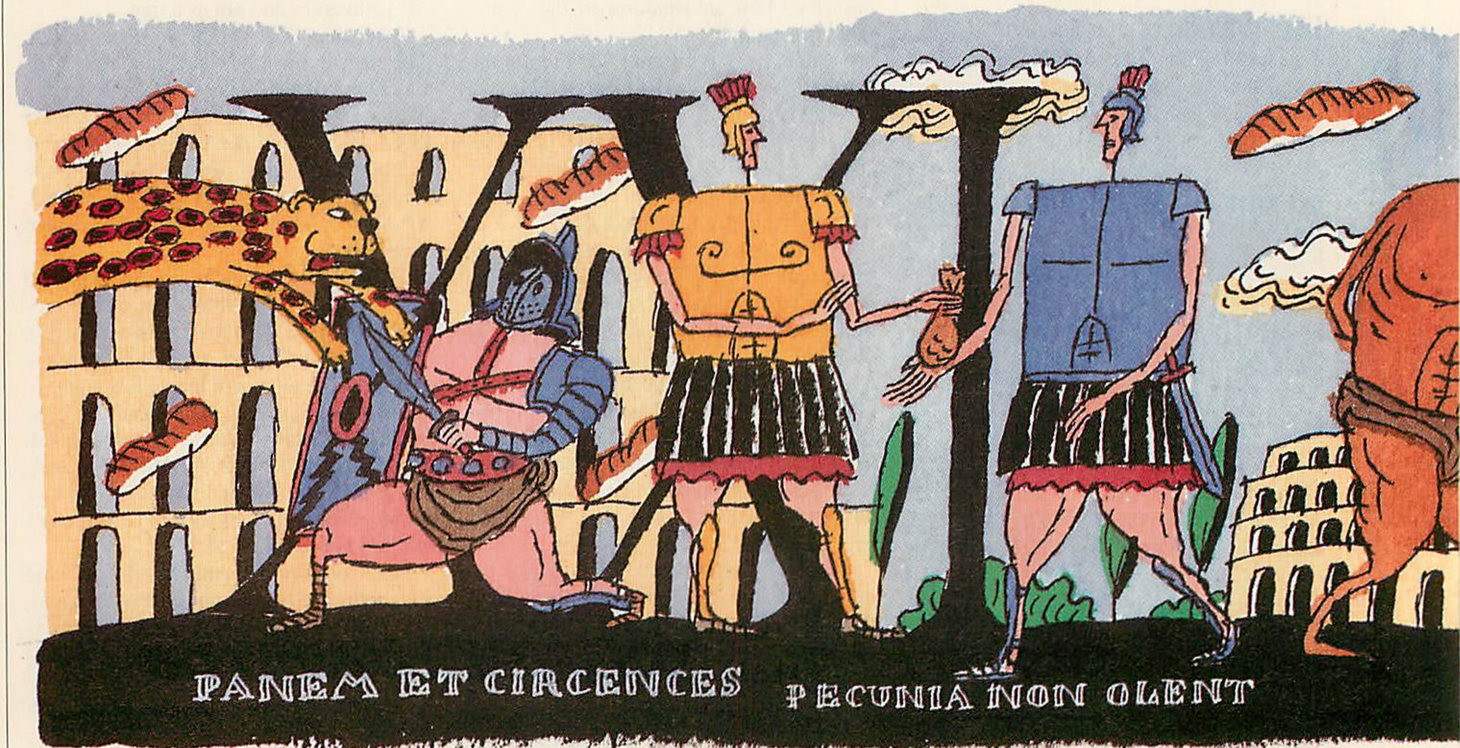
In fact, it is only thanks to one of man's most brilliant inventions, a mere dot representing the Arabic zero, that we are not lumbered with Roman numerals. In numbers, the Roman notation is so cumbersome that it is a wonder that any trade could exist at all and, yet, Rome was a consumer economy. The trade was huge and very much over-simplified by Juvenal's phrase 'bread and circuses'. Imports of every kind flooded into Rome, ranging from the two obelisks ordered from Egypt for the harbour at Ostia to luxuries, such as oysters from Britain.

In the early days of the Empire, the Gauls would trade anything for a flagon of wine. Rather surprisingly, Gaul, which became the apotheosis of viniculture, made no wines at all at that time. Since the rate of exchange seems to have worked out at about three gallons of Chianti, or whatever they called it, to one slave, wine soon became an international currency. We speak today of the tonnage of ships but originally the capacity of a merchant ship was measured by the number of tuns of wine that she held.

Apart from booze, most imports of metals, precious stones, pearls and even the books for the 26 public libraries, had to be bought with money. Similarly the army and the civil service were mostly paid in cash. Imagine the sheer scale of their wages. The coinage was excellent and versatile but how could they count it and make their calculations? If one slave costs XVII sestertia, how much for a consignment of XXV?

When Rome was sacked by Alaric the Goth in 410 AD, Roman numerals might have gone the same way as hieroglyphics to become merely a curiosity from the past with an enduring fascination only for the specialist. As it turned out, they persisted for nearly 1000 years because, as the empire crumbled, Rome became the acknowledged centre of Christendom during a period when numeracy was largely in the hands of the Church.

Around the same time as Alaric, we had in England the semi-mythical Hengist and Horsa, who were followed by the Anglo-Saxon invasions and settlements. In the beginning, the Anglo-Saxons were pagans with a propensity for sacrifice by drowning. Later, they were gradually converted



to Christianity, by a sparrow in the first recorded instance, and came to need to calculate the date for the celebration of Easter – a feast named in English after one of their pagan goddesses.

All the maths had to be done in Roman numerals in the notation of the Roman calendar. Initially the Diocletian calendar and Indiction Years were in general use until the venerable Bede gave his scholarly support to the Christian Epoch, invented some 200 years earlier by Dionysius Exiguus.

The Easter Tables, as the calculations came to be called, had space on them in which the monks made random notes and so the Anglo-Saxon Chronicles were born. The dates were in Latin but the Chronicles were in English and, like Roman numerals, outlived the Anglo-Saxon rule.

From hard-drinking, quarrelsome ruffians, the Anglo-Saxons became highly civilised and developed a sophisticated society which William the Conqueror adapted and refined for his own requirements. One principal requirement was 'geld', a tax levied on the country according to its hundreds and wapentakes. The levy was calculated on a Chequer Board. The mechanics of the Chequer Board are a mystery but taxation still emanates ex-Chequer.

The three programs in the yellow pages are held together by Joe Telford's menu listing. The third demonstrates a suggested method of using the Chequer Board.

Historically, the method is purely conjectural but it does seem to work. I imagine that the numbers were represented by counters and multiplication or division by 10 may be achieved by moving all the counters on the board two rows to the left or right. However, the unsolved problem is division by 12. From, let us say, the Sutton Hoo burial to 1963 there were 240 pennies to the pound.

Nevertheless, multiplication and division is also successive addition or subtraction. I do not know of any evidence of a Chequer board in Roman times but the technique works equally well with pencil and paper.

The second program simply converts between Roman and Arabic numbers, which is no great feat except that the other two utilities use the same procedure. I have not restricted the input to the correct Roman letters. The program simply copes as best it can with any sequence of capital letters. The word 'MANDLEBROT', for example, produces the number 1550 from MDL.

Lastly, for medieval historians, the program will calculate the day of the week for any date back to the start of the Christian Epoch. This was originally designated as 26th March 1 AD but was later backdated, by Pope Gregory XIII, to 1st January, with the Nativity falling seven days earlier in what mathematicians and astronomers would prefer to have called 0 AD. (753 AUC). The same Pope Gregory was responsible for the Gregorian Calendar, which came into effect in England in 1752.

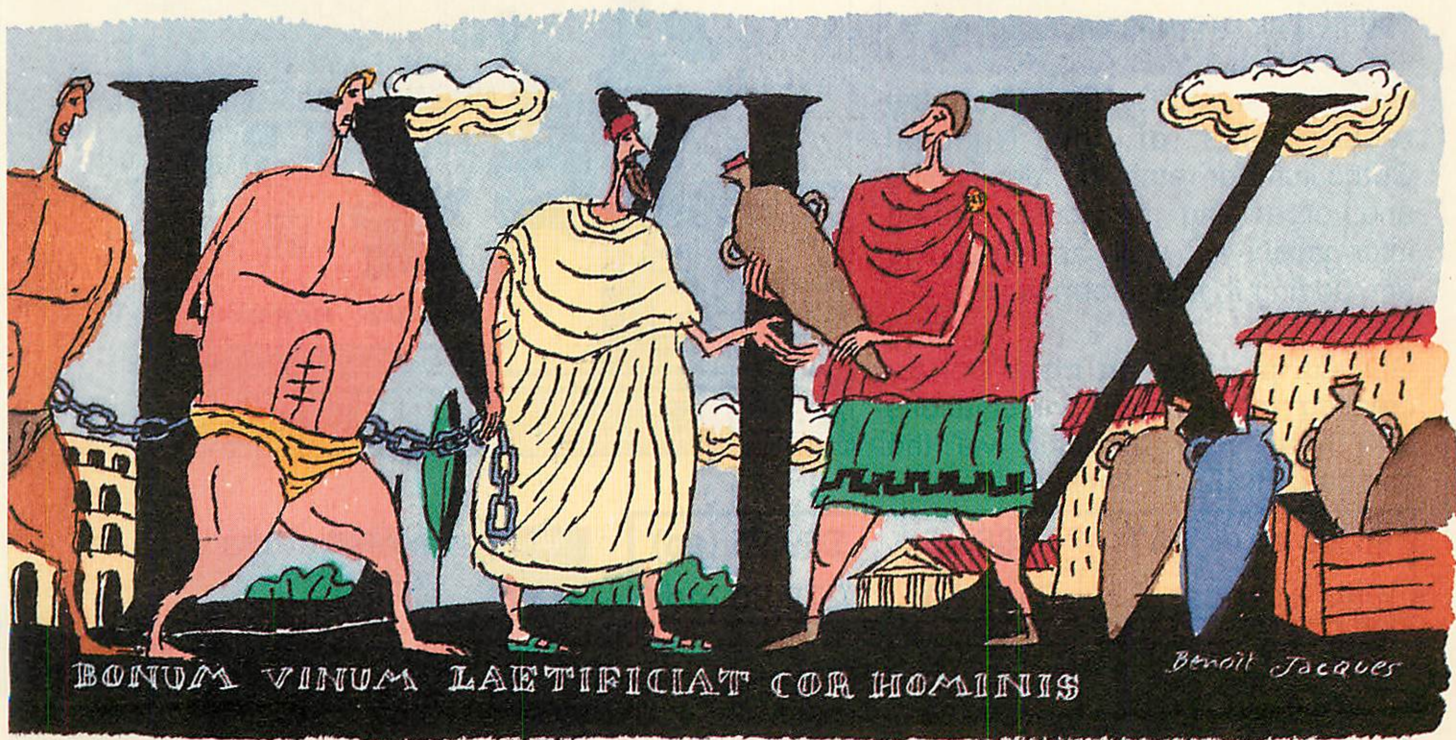
Except that we count forwards rather than backwards, our calendar is fundamentally Roman. The original Roman version was decimal. The months October (8) to December (10) are a reminder of it but, as their months were lunar, extra months had to be added and all of them lengthened to approximate to the solar year. Also, alternate months, excepting January and February, had 31 and 30 days from an early date.

Augustus spoilt the rhythm of the months by changing the numbers of days in the last five months and took Sextilis (6) for himself. He had started life as that Octavian who did not fancy Cleopatra. Historically, his change of name seems to have made him an altogether better person.

The program gives the days of the week in English although the Romans did name their days after the 'planets'. We retain names deriving from Saturn, the Sun and the Moon but the remainder have Germanic origins. The French, for example, retain them all including Mars, Mercury, Jupiter and Venus – 'dimanche' is only a contraction of Dies Dominica, which the Christians came to call Dies Solis.

The rest of the date is reproduced in the Latin notation, using the rather bizarre logic of counting backwards from the three divisions of each month. That is, from the Kalends, the Nones and the Ides.

The Kalends is always the first day of the month and the Nones is always the ninth day before the Ides, although we would count it as the eighth since we do not count inclusively. The Ides was originally the middle day, from an Etruscan word, but in changing the length of the months they did not make corresponding alterations to the Ides. In eight months it fell on the 13th day, a Roman middle day in a lunar month of about 27 days and in March, May, July and October it fell on the 15th day.



STILL LEARNING

Following a recent company restructure, **LISA HUGHES** feels it's time to talk to Acorn's new Sales and Marketing Manager for Education – Chris Humphries

The release of The Learning Curve package is a clear signal that Acorn has turned its attention to the home market but where does that leave long-standing Acorn users? With a new man in charge of education, it seemed like an appropriate time to test Acorn's continuing commitment to its classic customer.

Under the recent restructure at Acorn, sales and marketing have been brought together to create what Chris Humphries characterises as a 'lean, mean approach.' The education division, which he heads up, is now 'working and operational.'

Humphries, whose full title is Sales and Marketing Manager, Education, is a smooth talker – a natural public relations man.

He chats easily about his Australian origins as a philosophy lecturer in Sydney, the two-year holiday to Europe which he's still on, his job as an ILEA media resources officer when new technology meant tape recorders and overhead projectors, and his experiences running his own independent production company making promo videos for stars like Gary Glitter and Elton John.

He arrived at Acorn via the Council for Educational Technology where he was assistant director and a stint at ICL running computer-based training. A brief tour through Humphries' CV confirms his work experience as wide-ranging and various and he sees himself, he says, as 'an innovator, a stimulator. I have a need for a challenge and like to change job every few years.'



For just less than a year, however, he has been at Acorn where, by his own admission, there is no shortage of challenges. He identifies three in particular.

Challenge number one is making Acorn's current product range education's first choice of system. 'I genuinely believe in the Archimedes as a product,' he says, 'and I believe it will continue to be number one.'

Obligatory endorsement over, he identifies Acorn's second challenge as servicing the National Curriculum and especially the use of IT across the curriculum. 'Education is saying it wants solutions: the right combination of hardware and software, systems that help meet specific requirements. It's a totality of four things: the right machine, software designed for the National Curriculum, peripherals and networks and, very importantly, support materials.'

Humphries and his team will deliver these solutions to education by working with key LEAs and other bodies, tapping into existing curriculum development initiatives and building partnerships.

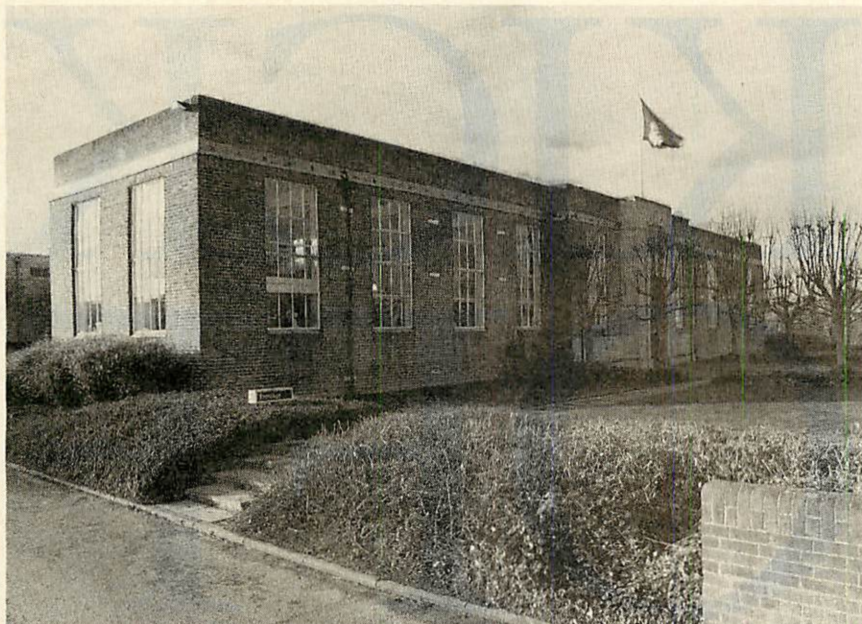
He talks of Acorn acting as a 'broker', ensuring information is disseminated by, for instance, the bundling of support materials with software.

'Meetings can be unproductive,' he says. 'It's a question of stimulating action... letting people know... talking to software houses and explaining changes in the education system... acting as a funnel... There isn't one solution, it's about facilitating, bringing elements together.'

The third challenge facing Acorn is local management of schools (LMS). According to Humphries, 'Its impact on the relationship between schools and manufacturers will probably be more significant than the National Curriculum.'

One of the complications is that almost every LEA sees LMS differently, never mind how it is perceived by individual headteachers. 'On a superficial level Acorn's problem is that we go from 140 educational customers to 33,000 but at the moment it's still unclear how LEA advisory services will continue to operate.

'In some cases schools will


Acorn's main office in Cambridge

wish to retain the use of the advisory service so LEAs will still be important. In other cases schools may go their own route.

'Development means addressing all these customers, creating mechanisms that enable us to work with LEAs and schools. The biggest mistake would be to have a hard and fast rule. We're also quite seriously examining the ways our dealers and distributors talk to education.'

LMS not only changes the nature of the customer, it also places a significant administrative burden on schools, thus creating special markets for computerised administration systems.

However, Acorn has no obvious ambitions in that direction with Humphries citing ICL, Bull and Acorn parent Olivetti as companies which specialise successfully in such systems.

In terms of computers in the curriculum, Humphries believes that with the Archimedes Acorn has got a better product to offer than any of its rivals.

His mission is to convince education of that. 'In the education market companies have to earn and continue to earn supremacy. You have to keep demonstrating that you've still got the best solutions for education.'

This doesn't sound like complacency and he insists that it's not, 'It would be a great mistake for Acorn to have any complacency at all.'

To validate his claims for the Archimedes' pedigree he talks about the phenomenally varied use of Acorn products in higher education, mentioning Newcastle and Stirling Universities as institutions which have recently opened large Arc-based labs.

'People are starting to realise that Risc OS machines have a different but significant role to play in tertiary education.'

You hear the salesman talking when he says, 'The environment it provides is the environment of the future and there is no better Wimp-based multi-tasking environment for the price', but his conviction certainly comes across.

He also throws in the up-and-coming prospect of Unix as the platform of the future, promising an established range of Unix products which will be of interest to further and higher education. But, predictably, he cannot be pressed on details.

At the other end of the age range Humphries admits to being pleasantly surprised at how quickly LEAs are moving towards buying the BBC A3000 for primary schools.

This may set alarm bells ringing in some minds, but sales of the Master were up last year and he states quite unequivocally that Acorn has no plans to discontinue the model. 'I have no intention of letting go of such a successful product and no intention of leaving education high and dry.'

Humphries is proud of another element in Acorn's educational policy, the Acorn teachers' scheme.

This offers a low cost, low finance route to buying a machine and he hopes that this will soon be extended to initial teacher training students.

Chris Humphries is an Acorn man: he is well rehearsed in saying all the right things from praising the existing product range to making positive, if tantalising, noises for the future.

Can he be taken at face value? The cynical view would be that in order for its push for parents to succeed, it needs to capitalise on its reputation in education.

There is irrefutable truth in this, after all it only makes good marketing sense, but Acorn does know education – enough of its employees are ex-teachers to guarantee that – and while it is determined to penetrate other markets, it is, at the same time, attempting to strengthen its commitment to end-users in education and does seem prepared to work at maintaining its reputation.

Chris Humphries is certainly aware of how tough the education market is and to leave the final word to him, 'We don't intend to sit still. Computing is growing but so are our activities.'


Acorn keeps active in the further and higher sectors of education too. New Acorn MD Sam Wauchope (right) in Newcastle Universities' Dental and Medical school, where Professor Alex Crombie, along with colleagues and students, is using a new computer teaching facility comprising 25 Archimedes computers linked via Econet.

KICK OFF

Don't you often wish that you could look up a phone number without disturbing your word-processing? This, and much more, is possible with Dropkick, a sideways Rom utility from **JEFF TULLIN**

The *Dropkick* SWR utility is a very versatile piece of software which gives access to textual information of any kind at your fingertips, at any time. You can use it to hold all your most used telephone numbers, help with Basic keywords or syntax, hold a price list, or indeed store any kind of list at all.

The information is stored in sideways Ram like a Rom image, and is called up with a *command – *SEEK. This means that it can be called from within Basic, or while using a wordprocessor, in any mode, without affecting the program in use.

Of course, the Rom image created by this program could be blown into an Eprom if the information was especially useful, and unlikely to change. However, if there are likely to be a number of changes to the data as time goes by, you will find that using the program in SWR is more convenient. This is because information carried in SWR can be changed at any time, simply by loading new data over the old. For example, you could have a datafile containing certain information on VDU codes installed, but need to find a friend's telephone number in a hurry. Simply load the new datafile containing telephone numbers into SWR, call up the number, reload the datafile for VDU codes, and carry on as before.

When someone's telephone number changes (like all London numbers will change this month), this presents no problem. You can quickly alter it by loading the datafile into, say, *Wordwise*, and amending their old telephone number to the correct one. Here's how the *Dropkick* program actually works.

Listing 1 is an assembly language program which creates the *Dropkick* Rom image. It assembles into memory at &3000, and then saves the assembled code to disc or tape automatically, under the filename 'header'. The assembler instructions it uses are available only in Basic 2 or over, but many articles have been published about how to emulate these instructions from Basic 1, if need be.

```
*SEEK G

BGET      Min. abr.= B.      ASCII= 9A
CLG       Min. abr.= CLG     ASCII= DA
DEG       Min. abr.= DEG     ASCII= 9D
GCOL      Min. abr.= GC.     ASCII= E6
GET       Min. abr.= GET     ASCII= A5
GET$      Min. abr.= GE.     ASCII= BE
GOSUB     Min. abr.= GOS.    ASCII= E4
GOTO      Min. abr.= G.      ASCII= E5
LOG       Min. abr.= LOG     ASCII= AB
PAGE      Min. abr.= PA.     ASCII= 90
RIGHT$(   Min. abr.= RI.     ASCII= C2
STN       Min. abr.= SGN     ASCII= B4
STRING$(  Min. abr.= STRI.   ASCII= C4
No (more) records found

*SEEK V

ADVAL     Min. abr.= AD.     ASCII= 96
DIV       Min. abr.= DIV     ASCII= 81
ENVELOPE  Min .abr.= ENV.    ASCII= E2
EVAL      Min. abr.= EV.     ASCII= A0
MOVE      Min. abr.= MOV.    ASCII= EC
SAVE      Min. abr.= SA.     ASCII= CD
VAL       Min. abr.= VAL     ASCII= BB
VDU       Min. abr.= V.      ASCII= EF
VPOS      Min. abr.= VP.     ASCII= BC
No (more) records found
```

Load the header code created, into sideways Ram, using the method which best suits your system. Owners of Solidisk's can load the code directly by typing *LOAD header 8000. BBC Master users can use their built-in *command *SRLOAD header 8000 <RAM SOCKET NO.> Q.) Pressing BREAK initialises the Rom image.

Once you have the header code assembled, and loaded into place in SWR, you need to create a datafile or two for the program to work on. The simplest method is to create a file using *Wordwise* or some other wordprocessor.

The format of the datafile is:

```
<text> (return &0D) <text> (return &0D)...
```

and so on followed by:

```
|<name of datafile>(return)
```

The only limit to how many <text> items the datafile contains is how much SWR you have in any one bank. The program assumes you have 16K of Ram.

This allows you to use datafiles of over 15K (&3200, or 12800 bytes). Users of smaller 8K or 12K Ram systems are restricted to &1200, or &2200 bytes, respectively.

Once a file has been created, it can be saved directly as a *Wordwise* file, or SPOOLed to disc from *View*.

Not everyone, of course, has a wordprocessor. For this reason, listing 2 will allow you to create a file using just Basic DATA statements.

It contains a small list of fictitious telephone numbers to give you an idea of the format.

Running listing 2 creates a datafile on disc or tape, which you can use to check that *Dropkick* is operating correctly. Note that a datafile created by this method produces double line spaces.

Now, there are two ways of using the header and a datafile together. Either you can load in the header, and follow this by loading a datafile above it at &8200, or you may wish to combine the header and a much-used datafile into one single file, and then just load this file in one go, as you need it.

For those of you who wish to create this full, combined Rom image as you would, for instance, if you wished to blow an Eprom chip of *Dropkick*, listing 3 will do the job for you.

When run, it asks you for the name of the datafile you want to append to the header code, then the name of the new file containing both header and code. Thereafter, you just load this whole Rom image into SWR when you need it .

If the datafile is too long, an error message is produced. In practice, however, this is unlikely to happen.

The figure of &3200 bytes is more than the capacity of my standard 32K micro fitted with *Wordwise Plus* and running in mode 7, so you need to be pretty determined to create a datafile long enough to run up against the problem (but see later).

Dropkick responds to two star commands, *HELP and *SEEK, both of which can be abbreviated like other operating system commands.

The syntax for *SEEK is:

```
*SEEK <text>
```

where text can be any alphanumeric string, with the exception of the character '|' (Ascii 124). This character denotes the end of the datafile, so any text after that character will be treated as the filename and ignored in any search.

This character was chosen because it is very rarely used but is easily entered from the keyboard. The bare header code is assembled with this character in place at &8200, showing the absence of any data beyond that point. When you load a new datafile into SWR at &8200, the '|' character is overwritten.

Following the command *SEEK <text>, *Dropkick* takes the <text>, ignoring any leading spaces, and scans the datafile from the beginning to the end, printing out any strings it finds containing <text>. This continues until the end of the datafile is found. Note that the program is case-sensitive. Thus a telephone list containing 'Acorn User 01-490 1444' would display this number after *SEEK Acorn, but not after *SEEK ACORN. The less <text> you give, the more likely *Dropkick* is to find a record which is suitable.

For instance, a datafile set up like a price list could be scanned for all items of one pound something with the command *SEEK] £1. Likewise, *SEEK £ would probably print out every record in the file.

When *Dropkick* has scanned the whole datafile, the routine exits and prints 'No (more) records found'. Obviously, it may have found no match for <text> at all, hence the word (more) in brackets.

With the header code and data installed in SWR, the datafile , as mentioned earlier, can swiftly be exchanged for a different one. This is done by loading the new data into SWR at address &8200. (Solidisk users- *L.(filename) 8200. Master users- *SRLOAD (filename) 8200 <rombank>Q).

As I indicated earlier, the maximum capacity of a 16K SWR is &3200 bytes. A large datafile could contain much more than this, so I wondered if more than one SWR bank could be set up with *Dropkick*, each image with its own 15K of data.

Unfortunately, *Dropkick* normally exits after the command *SEEK by setting the accumulator to zero, thus telling any other Roms in your machine that the Rom call has been dealt with, and therefore to pay no attention to it.

With two *Dropkicks* installed, the higher priority one dealt with the call, whilst the other sat blissfully unaware that anything was happening.

I solved that problem by preventing *Dropkick* from clearing the accumulator on exit. However, this meant that after a *SEEK command, all *Dropkicks* installed worked correctly, but a 'Bad command' error was created by the filing system when it clearly was no such thing.

I overcame this by altering the code of all but one of these images of *Dropkick* so that only the version of *Dropkick* in the lowest priority Ram slot had the normal code, as produced by listing 1. Any others had to act on the *SEEK command, but pass it unchanged to the next Rom. This version is created by changing line 2470 of listing 1 to read:

```
2470 NOP:NOP
```

or by loading an ordinary version of *Dropkick*, and then changing bytes &81C5 and &81C6 to &EA.

Note that these 'altered images' should not be used without a normal image of *Dropkick* in a lower priority Rom socket.

MONTHLY DISC BONUS

Creating a large datafile can take a long time, and for this reason, any useful list of records would be too large to print in the magazine for you to type in yourself. Therefore, as a bonus on the monthly listings disc, you will find two datafiles already prepared.

The first contains a list of Basic keywords, their minimum abbreviations, and their token numbers, for use as a Basic 'help' Rom. There is also a similar 'help' file for *Wordwise Plus* embedded commands and keywords.

The data for these programs took several hours (and numerous cups of coffee) to type in. And that's a good excuse, I think you'll agree, to buy this month's disc!

For details of how to obtain the *BBC Acorn User* monthly disc – and all the other *BAU* special offers – see pages 105-114 of this issue.



RAILWAY CHILDREN

DAVID WILLIAMS looks at the new Fernleaf educational simulation, Railway Drama, and asks if education software is at long last achieving some versatility

Schools are currently coping with many innovations, including the requirement that all children should use computers 'across the curriculum'. Primary schools have a long history of using a topic-based approach but for secondary school teachers to break out of subject boxes labelled 'maths' or 'English' and work together on a common project is asking rather a lot!

Even with innovative timetabling and staff who are willing to experiment, lack of software is a major problem: software houses can't afford to develop suitable packages until schools buy them and schools can't buy until there are suitable packages available!

There have been several excellent ones in recent years, including the *Mary Rose* and *Climbing Everest* simulations but now a specialist software house has produced a number of linked 'dramas' that cut right across subject boundaries.

Fernleaf Software has added *The Railway Drama* to its series of simulations and a few minutes with this package shows that a great deal of careful thought and planning has gone into it.

The story is based on the rise and fall of a real railway but set in the fictional Vale of Woolfordshire. The drama is in three acts and covers the years 1870 to 1960, starting with the planning of a Victorian branch line, the day-to-day running of the line and its decay and final death under the Beeching cuts.

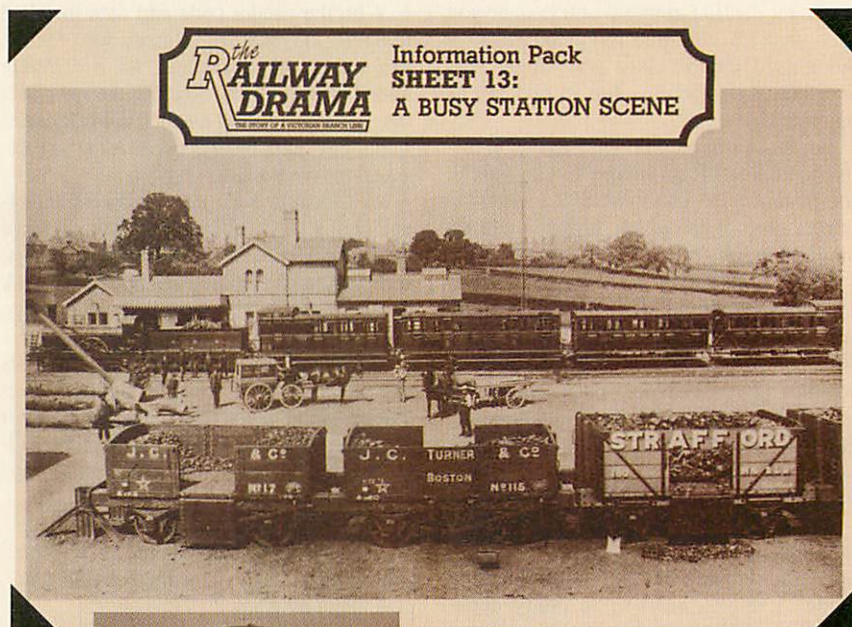
The authors are fully aware of the problems of using software in the classroom and have built in considerable flexibility. Up to six groups can have their progress stored on the master disc and other groups' work can be kept on a subsidiary disc. Each group could be at a different place in the drama and, under teacher control, can skip or simplify the problem.

I asked two intelligent 16-year-old girls who made a point of never touching a computer to test the program.

The ample documentation makes it clear that time should be spent in background reading before starting and also that a lot of the work will actually be done away from the computer.

There are three copies of the players' notes (photocopiable), a teachers' booklet and 19 A4 pages in the information pack, all nicely printed in black and white on glossy paper. These give two maps of the area, photos of actual documents such as a solicitor's letter and an Act of Parliament, and a number of background railway scenes such as 'a busy country station', and 'shunting in the station yard'.

The first activity with the computer is to practise using the database by answering sets of graded questions. The databank contains essential information needed to build a branch line and the menu page is well laid out in a matrix.





The first question in the chosen set was 'What time do workers at the brickworks start in the morning?' It was repeatedly emphasised that notes needed to be taken. The girls found a map on the database that showed the position of the main industries and another page which showed the sizes of towns and villages, so they duly made their notes.

Despite searching the databank, however, Naomi and Cathy could not find the answer but they did find a lot of other information which came in useful later on!

Once they started Act 1, they were 'charged' each time they used the databank from the 120 units of money allowed for the project, so they got as much as they could for free!

At last they could start on Act 1. As in real life, the girls were not sure what they needed to know. There was a lot of data available that might be relevant and it needed sifting.

Like most people, they tried to cut corners and get on with the most interesting part, planning the line, but as it turned out, here they made a fatal error.

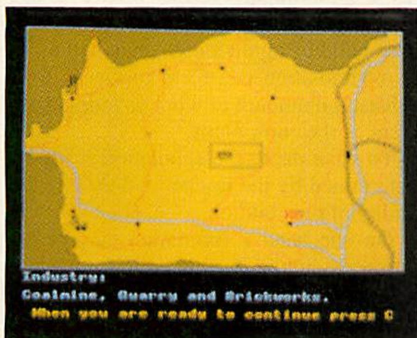
The program wisely allowed them to practise planning the proposed line on-screen. Where to put the main line junction

was obvious and the instructions were clear. Adding a length of line gave a choice of five slightly different directions to move in, using the function keys.

It was quite hard choosing the right key to get the required angle and the line had several surprising wiggles as a result! Just as well it was only a trial run.

Their notes were put to the test when adding sidings for the local industries, as these were not marked on the printed map. Lastly the stations were entered.

After this came the real thing where you were 'charged' for any mistakes you made. There were many factors to bear in mind: where were the main population centres



and industries and what were the whims of the landowners?

The plan had to be submitted to the shareholders for their approval. Would it pass? The industries were pleased with the facilities, the local people were pleased with the stations, the plans were within budget, but there was that fatal error – they had upset the local landowners and the plan was rejected.

The error arose because a vital piece of information wasn't found in the databank and had not been included in the plan. This meant that the whole plan had to be redrawn but this time they passed with flying colours.

Act 1 had now been completed in about 90 minutes, roughly half of it spent on the computer. The girls were completely engrossed in the drama and were using many skills.

They had succeeded in using the written documentation and the databank to acquire information.

They had made notes and maps, filtering out what was needed, arguing and compromising, and then used these intelligently to produce a good plan.

Act 2 was a disappointment after the success of Act 1. The branch line was now running and a timetable had to be designed by the childrten to meet an assortment of demanding needs.

People had to get to work on time and holidaymakers wanted to visit the seaside for a day out, trains had to be met at the main line junction, and being a single track line with passing places, careful thought was required. In the event this was distinctly tedious.

Having used the databank again to get the required information, they had six stations and 14 trains planned which meant over 150 calculations.

The arithmetic was trivial, but had to be absolutely accurate, otherwise trains would not meet at the passing places, or would miss the main line connection.

This was good discipline, but I query whether the benefits were worth the time that was involved, which was another one and a half hours.

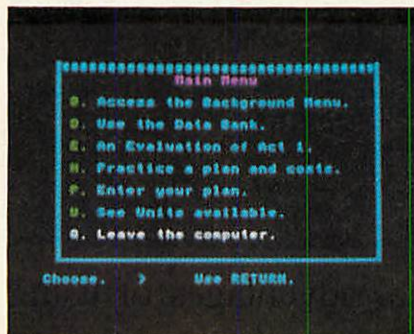
One of the problems with this part of the exercise was that the work could not be split up and delegated, so one person finished up doing it alone.

Entering it into the computer was also laborious and I feel that Fernleaf missed a great opportunity here.

At no time did we see the completed timetable and yet it was obvious that a spreadsheet could be used, with the formulae pre-entered by the program. The whole timetable could then have been seen, printed out and checked.

Having had it checked by the computer, and found to be wanting, the girls had to start all over again, instead of just amending it, which caused frustration.

However, there was an unexpected joy to come. The second attempt was successful and the reward was some delightful graphics showing two trains starting out, pausing at each station and waiting if nec-



essary until the other train arrived at the passing place.

To give credit to Fernleaf, the teacher can skip the children's planned line and use a simple one which is provided.

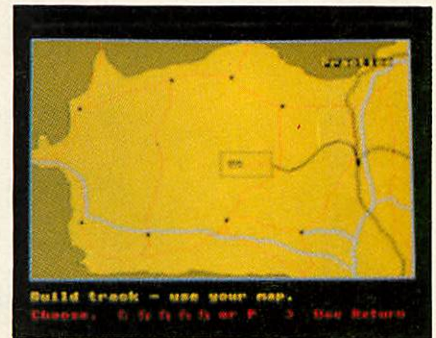
This would speed up the timetabling but wouldn't have been quite the same for the girls. Again, this Act had taken one and a half hours, of which about half an hour was spent on the computer.

Act 3 found the line losing money heavily, with competition from other methods of travel including buses and cars.

Cuts were needed so the children tried closing stations and changing some stretches of track to 'goods only' traffic.

Sadly every combination proved unacceptable to the computer evaluation.

Now this may have been true in real life but I think there should have been a 'least unacceptable' solution which passed the evaluation. Here the girls found the only example where instructions were not clear.



They had to use an X to mark the start of a section to be closed but were never told how to end the section!

This was the end of the computer involvement but *The Railway Drama* notes suggest masses of supporting activities. Each Act has a sequel which recommends research into things like the blacksmith's wife, the opening ceremony, or the effect of a proposed motorway.

It was clear that Naomi and Cathy had been completely involved in the simulation and that they found it both enjoyable and stimulating.

This in itself was notable for two non-computer users. When I asked why they enjoyed it, they said, 'Because although it was challenging, we felt it was something we could succeed at. It was much better having the computer check our results than going to the teacher.'

When I asked what range they thought it was designed for, they felt 14 to 16 was about right. These two were of above average ability, so less able pupils might take twice as long and I am not sure that 10-year-olds could do much without a lot of help.

So is it worth nearly £40? It promotes a wide range of skills and is particularly strong on interpretation of data, decision-making and communication skills.

It is not so strong, perhaps, on developing mathematical skills. But overall it hangs together well and is accessible to a wide range of ages and abilities, with plenty of backup material across a number of curriculum areas.

The Railway Drama *is available from Fernleaf Educational Software Ltd, Fernleaf House, 31 Old Road West, Gravesend, Kent DA11 OlH (Tel: (0474) 359037). It runs on the BBC model B, Master 128 and A3000 and will cost £39.95 to educational users.*

DIGGING UP THE PAST

CHRIS DRAGE unearths the real advantages of using simulation packages as a classroom aid to learning





Although computer simulations are not complete representations of reality, they nevertheless provide a useful focus for learning. A good computer simulation should promote a range of subject-orientated skills, knowledge and concepts and develop self-reliance and decision-making skills. It should also foster attitudes of co-operation and empathy.

A good simulation does not necessarily have to be sophisticated and grandiose. On the contrary, in my experience the most successful simulations are those which actually keep animation and complex graphics to a minimum, relying instead on providing a skeletal framework on which children build using their own imagination.

A simulation can form the basis for a substantial amount of work covering many areas of the curriculum.

To what depth the simulation is used is determined by the teacher and the age and ability of the children.

On one hand a simulation may be all-encompassing, a starting point from which a variety of subordinate tasks and activities develop. Alternatively, it may be only one activity among a number, each with a common theme.

With all simulations the teacher must work at developing the learning resources and be prepared to adopt an advisory role.

'...on the fourth day I woke up hearing noises outside the tent. It was Gareth cooking breakfast. After breakfast we went to the digging site in the west. We all started digging and digging but there was nothing at all there.

'We were just about to give up when Ned said "Let's try more to the east". We walked towards the east dragging our tired legs and our tired arms and finally we got there. We were so tired we could not lift a finger.'

This extract from eight-year-old Hannah's 'diary' proves how real a computer simulation can be for children, providing it is introduced and developed with care.

For three weeks in the 1990 spring term my class sweated and clawed its way

through Dinosaur Valley, facing all manner of 'perils'.

The motivating force behind it all was a simplistic program called *Dinosaurs*. I chose this program because it fitted in well with the work the class was doing on science attainment target 4 (genetics and evolution) level 3, and science attainment target 2 (variety of life) level 3. It also, of course, involved attainment target 12 (information technology).

Dinosaurs is an ideal simulation for seven to eight-year-olds. Equally, it would be useful as a 'first' for teachers unsure of using computers in this manner.

The program simulates an archeological dig where children unearth the skeletal remains of dinosaurs and must then try to identify which dinosaur they have discovered.

The pack includes a set of plans of the eight sites, complete with buried skeletons, and a complimentary set of transparent overlays of each dinosaur as it is believed to have looked in the flesh.

The program plots the children's moves on a 20x20 grid, informing them at each move whether they have discovered a site or not. When a site is stumbled upon, an option to 'dig' is offered.

This presents a new screen comprising a 5x5 grid. Five rectangles may be uncovered before digging must stop for the day. When all activity ceases the position is saved to disc before a new team continues its exploration to uncover the complete skeleton at their particular site.

Children very quickly become skilled at predicting which square will reveal the next part of the skeleton. The program can handle the data for up to 10 groups.

Palaeontologists will immediately criticise the program for its lack of scientific accuracy: on real digs, rarely, if ever, are fossilised skeletons discovered intact. More often than not all that remains is a giant jigsaw puzzle. However, this inaccuracy offers a teaching point which can be covered in detail during the preliminary work.

With any computer-based simulation there will be a number of prerequisite skills and concepts that children must possess if they are to gain maximum benefit from the experience.

In this case the class was offered a variety of experiences, including the handling and close observation of real fossils dating from the palaeozoic era to the cenozoic era (attainment target 1).

In this work the children were given 20 fossil examples and had to find information about each one from a database (*Key*) set up on both a BBC micro and an RM Nimbus (attainment target 12).



The information was recorded next to detailed drawings of each fossil.

This work provided a basis for children to build their own dinosaur files from research evolving from the *Dinosaurs* program. The Natural History Museum is another excellent source of first hand experiences.

In terms of *Dinosaurs*, the class' task was to explore 'Dinosaur Valley' (as we decided to call the scenario), discover and identify each 'fossil' the children found (attainment target 1 – observation) and then 'flesh-out' a skeletal representation of the dinosaur on a worksheet using illustrations in books as a guide.

In addition, children wrote and illustrated daily accounts of their experiences.

This is from seven-year-old Caroline's diary:

'...After lunch we went back to dig and it started to rain.

We had forgotten our waterproofs but soon the sun came out and Gareth went for a swim in the river. He lay on his back in the water and left us to dig. We found the rest of the dinosaur except the tail.

'We went back to our tents for supper. After supper we decided to go back and try to find the tail but we got too tired and gave up and returned to bed.'

Children were grouped in fours with a mix of ability and gender. At least one able reader was placed in each group to help with the reading.

Decisions had to be arrived at regarding how to shoulder the work equally with no subdivision of tasks according to gender-specific roles.

The question of leadership also arose. Most children happily adopted a democratic approach but there were a few who wanted an individual to be their arbitrator.

Some groups formulated rules to govern their behaviour at the computer and in their diaries.

Sometimes children's writing offers opportunities for integrating other curriculum areas like design and technology.

Benjamin, aged eight, wrote *'...we walked for two miles until we came across a river. Marvin had an idea: to use a flying fox to cross it.*

'We got our flying fox out then we threw a line over to the other side. Marvin went first then the two Jennys. I went last. "Thank God that's over" said Jenny C.'

This offered the opportunity for the group to explore the feasibility of using a flying fox in this context. Using construction materials like Lego Technic, Teko or junk items, a flying fox could be built to cross a scaled down river. It could then be tested, modified, if necessary, and conclusions drawn.

Similarly, opportunities for including other IT skills arose throughout the topic. Some children used *Pendown* on the second BBC micro to write their diaries or to design and print out headings for their diaries. One child who had *Pendown* on his Beeb at home, wrote his draft copy at school and typed in the final version at home.

Another child drafted his work at school and produced the final copy with *Acorn DTP* on an Archimedes at home.

Using a variety of media the children visually expressed their ideas. Paper and card collages depicting Dinosaur Valley as it may have looked 80 million years ago were made on an individual basis.

The whole class participated in a huge mural illustrating each group's visit to the valley (including all the digging sites). Groups of children dramatised scenes from their diaries.

The study concluded with the class sharing their work with the assembled school. Simulations stand or fall on the support a teacher is able to build around them.

Context is all important and it is the teacher's responsibility to prepare the ground adequately.

Some packages help the teacher to do this with outlines, development material and background reading. Others, like *Dinosaurs*, merely provide the bare bones. All simulations, however, allow the teacher to experience a change in his or her relationship with the class, from being the teacher to becoming the guide in a learning experience.

Simulation software, when placed in the hands of a skilled teacher, can successfully lead children into imaginary worlds beyond their experience and provide a launch pad for a great deal of cross-curricular work.

Dinosaurs is available from Cambridgeshire Software House, 6 The Quay, St Ives, Huntingdon, Cambridgeshire PE17 4AR, for the BBC B, Master 128, Compact, RM Nimbus. Educational price: £20.

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THE ARCHIMEDES LASER PRINTER

The LaserDirect consists of an interface board, our RISC OS printer driver software, and a special version of the 300 dpi Qume six page per minute printer. Because the board drives the printer 'engine' directly, not only does this save a complex controller board usually resident in the printer, but it also means it prints very much faster than traditional printers. The speed is a combined result of our optimised RISC OS printer driver, the RISC processor and the unique 2Mbit/second data link to the printer. One other significant advantage is that the LaserDirect uses the Acorn outline fonts installed in the machine, so guaranteeing all fonts seen on screen will print - no need to make sure the fonts match those installed in your PostScript printer.

The result is a printer whose quality is the same or better than traditional lasers, that can use all RISC OS outline fonts, that is faster than traditional printers, and costs less.

Special features - Software on board means it is always available and can be automatically installed on startup - no loading from disc • The LaserDirect offers special links to other Computer Concepts software. For example, when combined with the new Scan-Light Plus software, it offers a direct scan to print facility. It can scan and print a full A4 page in under a minute. • A PostScript compatible interpreter will also be available, turning the Archimedes and LaserDirect printer into a very fast PostScript compatble printer (but using the Acorn outline fonts).

LaserDirect Qume (incl. printer, interface board, and software) £999 +VAT & carriage

The Qume Liquid Crystal Printer is not technically a laser printer. Instead of having a laser and spinning mirror arrangement, this printer has a conventional light source shining through a liquid crystal shutter array. The result is fewer moving parts, a lower cost and a more reliable printer. It also occupies a very small amount of desk space - 42cm by 42cm, no more than a standard dot-matrix.

Compatible with all applications that use RISC OS printer drivers, e.g. Draw, Paint, Pipedream, ADP, Impression etc.

PERFORMANCE TESTS

	test 1	test 2	test 3	RRP
Typical PostScript	12'03s	5'13s	4'16s	£ 3000
Typical LaserJet	5'35s	4'29s	31'35s	£1400
LaserDirect Qume	2'43s	1'00s	4'29s	£ 999

Test 1 - A complex page of text and graphics from Acorn Desktop Publisher
Test 2 - The same test page from Impression
Test 3 - A 10 page text document from Impression

The LaserDirect requires a minimum of 2Mbytes of RAM in the Archimedes. However, the more memory available the better the performance. The tests were performed on an A420 machine (2Mbytes RAM) with hard disc. All times in minutes & seconds.


Computer Concepts Ltd

Gaddesden Place, Hemel Hempstead, Herts. HP2 6EX. Tel (0442) 63933 Fax (0442) 231632

The above details are subject to change. All trademarks are acknowledged.

COMPATIBILITY

Program	Page	BBC B	B+/128	Master 128	Master Compact	Electron	Arc	6502SP/ Turbo	ADFS	Econet	Shadow RAM	Monthly Disc
Risc Revue	30											
Listing 1-4							■		■	■	■	■
Eight Bits	58											
Listing 1(1)		■	■	■	■			■	■	■	■	■
Listing 2(2)		■	■	■	■	■		■	■	■	■	■
Listings 3-4		■	■	■				■	■	■	■	■
Image Manipulation	64											
Listings 1-2		■	■	■	■	■	■	■	■	■	■	■
File Find	69											
Listings 1-2							■		■	■	■	■
Romans	72											
Listing 1		■	■	■	■	■	■	■	■	■	■	■
Listings 2		■	■	■	■		■	■	■	■	■	■
Drop Kick	78											
Listings 1-3(3)		■	■	■	■	■		■	■	■	■	■

Note: (1) requires intersheet (2) requires ADFS (3) requires Sideways RAM

RISC REVUE

Listing 1

```
   10 REM >Explosion (RR1)
   20 REM by Reuben Wells
   30 REM for Archimedes only
   40 REM (c) BAU June 1990
   50 :
   60 PROCsetup
   70 PROCcode
   80 *SLOAD PaintDemo
   90 *SCHOOSE riscos
  100 *FX 112,2
  110 CLS
  120 PLOT &ED,0,0
  130 endx%=4
  140 REPEAT
  150 *FX 112,2
  160 startx%=endx%
  170 WHILE FNisblank(endx%) AND endx%<1280
  180 endx%+=4
  190 ENDWHILE
  200 WHILE NOT FNisblank(endx%) AND endx%<1280
  210 endx%+=4
  220 ENDWHILE
  230 IF endx%<1280 THEN
  240 dots%=FNscan_screen(startx%,4,endx%-4,256,frames%)
  250 *FX 112,1
  260 PROCexplode(startx%+100,640,dots%)
  270 ENDIF
  280 UNTIL endx%>=1280
  290 *FX 112,1
  300 END
  310 :
  320 DEF FNisblank(x%)
  330 LOCAL y%
  340 y%=0
  350 WHILE y%<256 AND POINT(x%,y%)=40 AND TINT(x%,y%)=0
  360 y%+=4
  370 ENDWHILE
  380 =(y%=256)
  390 :
  400 DEF FNscan_screen(xmin%,ymin%,xmax%,ymax%,frames%)
  410 A%=frames%
  420 B%=xmin% DIV 4
  430 C%=256-(ymax% DIV 4)
  440 D%=xmax% DIV 4
  450 E%=256-(ymin% DIV 4)
  460 dots%=USR(read_screen)
  470 =dots%
  480 :
  490 DEF PROCexplode(xmin%,ymin%,dots%)
  500 A%=dots%
  510 B%=xmin% DIV 4
  520 C%=256-(ymin% DIV 4)
  530 CALL initialplot
  540 FOR i%=1 TO frames%
  550 CALL animate
  560 NEXT
  570 ENDPROC
  580 :
  590 DEF PROCsetup
  600 MODE 13
  610 vel=30
  620 maxdots%=4000
  630 frames%=100
  640 nullcol=192
  650 DIM code 2048
  660 DIM table maxdots%*20
  670 SYS "OS_RemoveCursors"
  680 SYS "Hourglass_On"
  690 FOR i%=0 TO maxdots%-1
  700 SYS "Hourglass_Percentage",(i%/maxdots%)*100
  710 table!(i%*20)=(RND(vel*128)-vel*64)
  720 table!((i%*20)+4)=(RND(vel*128)-vel*64)
  730 NEXT
  740 SYS "Hourglass_Smash"
  750 ENDPROC
  760 :
  770 DEF PROCcode
  780 screenbase=12
  790 tablebase=11
  800 temp1=10
  810 temp0=9
  820 dots=8
  830 xpos=7
  840 screenadd=6
  850 col=5:ypos=5
  860 ymax=4:tableadd=4
  870 xmax=3:notused=3
  880 ymin=2
  890 xmin=1
  900 frames=0:numdots=0
  910 :
  920 FOR pass%=0 TO 2 STEP 2
  930 P%=code
  940 [OPT pass%
  950 .read_screen
  960 STMFD R13!,{R14,R0-R4}
  970 ADR R0,vdu_vars
  980 ADR R1,screen_base_lable
  990 SWI "OS_ReadVduVariables"
 1000 LDR screenbase,screen_base_lable
 1010 LDR tablebase,table_base_lable
 1020 LDMFD R13!,{R0-R4}
 1030 \
 1040 MOV dots,#0
 1050 .loop1
 1060 MOV temp0,#320
 1070 MLA screenadd,temp0,ymax,screenbase
 1080 MOV xpos,xmin
 1090 .loop2
 1100 LDRB col,[screenadd,xpos]
 1110 CMP col,#nullcol
 1120 BLNE record_dot
 1130 ADD xpos,xpos,#1
 1140 CMP xpos,xmax
 1150 BLE loop2
 1160 SUB ymax,ymax,#1
 1170 CMP ymax,ymin
 1180 BGT loop1
 1190 MOV R0,dots
 1200 LDMFD R13!,{R15}
 1210 \
 1220 .record_dot
 1230 STMFD R13!,{R14}
 1240 MOV temp0,#20
 1250 MLA temp1,temp0,dots,tablebase
 1260 LDR temp0,[temp1,#0]
 1270 MUL temp0,frames,temp0
 1280 ADD temp0,temp0,xpos,LSL #8
 1290 SUB temp0,temp0,xmin,LSL #8
 1300 STR temp0,[temp1,#8]
 1310 LDR temp0,[temp1,#4]
 1320 MUL temp0,frames,temp0
 1330 ADD temp0,temp0,ymax,LSL #8
 1340 SUB temp0,temp0,ymin,LSL #8
 1350 STR temp0,[temp1,#12]
 1360 STR col,[temp1,#16]
 1370 ADD dots,dots,#1
 1380 LDMFD R13!,{R15}
 1390 \
 1400 .initialplot
 1410 STMFD R13!,{R14,R0-R2}
 1420 ADR R0,vdu_vars
 1430 ADR R1,screen_base_lable
 1440 SWI "OS_ReadVduVariables"
 1450 LDMFD R13!,{R0-R2}
 1460 LDR screenbase,screen_base_lable
 1470 LDR tablebase,table_base_lable
 1480 MOV dots,numdots
 1490 MOV tableadd,tablebase
 1500 .loop3
 1510 BL draw_it
 1520 ADD tableadd,tableadd,#20
 1530 SUBS dots,dots,#1
 1540 BNE loop3
 1550 LDMFD R13!,{R15}
 1560 \
 1570 .animate
 1580 STMFD R13!,{R14}
 1590 LDR screenbase,screen_base_lable
 1600 LDR tablebase,table_base_lable
 1610 MOV dots,numdots
 1620 MOV tableadd,tablebase
 1630 .loop4
 1640 BL draw_it
 1650 BL alter_table
 1660 BL draw_it
 1670 ADD tableadd,tableadd,#20
 1680 SUBS dots,dots,#1
 1690 BNE loop4
 1700 LDMFD R13!,{R15}
 1710 \
 1720 .draw_it
 1730 STMFD R13!,{R14}
 1740 LDR xpos,[tableadd,#8]
 1750 ADD xpos,xpos,xmin,LSL #8
 1760 CMP xpos,#0
 1770 BLT skip1
 1780 CMP xpos,#320<<8
 1790 BGE skip1
 1800 LDR ypos,[tableadd,#12]
 1810 ADD ypos,ypos,ymin,LSL #8
 1820 CMP ypos,#0
 1830 BLT skip1
 1840 CMP ypos,#256<<8
 1850 BGE skip1
 1860 MOV temp0,#320
 1870 MOV temp1,ypos,LSR #8
 1880 MUL screenadd,temp1,temp0
 1890 ADD screenadd,screenadd,xpos,LSR #8
 1900 LDRB temp1,[screenbase,screenadd]
 1910 LDR temp0,[tableadd,#16]
 1920 EOR temp1,temp0,temp1
 1930 STRB temp1,[screenbase,screenadd]
 1940 .skip1
 1950 LDMFD R13!,{R15}
 1960 \
 1970 .alter_table
 1980 STMFD R13!,{R14}
 1990 LDR temp0,[tableadd,#0]
 2000 LDR temp1,[tableadd,#8]
 2010 SUB temp0,temp1,temp0
 2020 STR temp0,[tableadd,#8]
 2030 LDR temp0,[tableadd,#4]
 2040 LDR temp1,[tableadd,#12]
 2050 SUB temp0,temp1,temp0
 2060 STR temp0,[tableadd,#12]
 2070 LDMFD R13!,{R15}
 2080 \
 2090 .vdu_vars
 2100 EQUD 148:EQUD -1
 2110 .screen_base_lable
 2120 EQUD 00
 2130 .table_base_lable
 2140 EQUD table
 2150 ]NEXT
 2160 ENDPROC
```

Listing 2

```
   10 REM >MakeSprite (RR2)
   20 REM by Dave Acton
   30 REM for Archimedes only
   40 REM (c) BAU June 1990
   50 :
   60 MODE 13
   70 OFF
   80 GCOL 128+40
   90 CLG
  100 PRINTTAB(0,31)"TESTING";
  110 FOR r%=20 TO 4 STEP -4
  120 FOR x%=0 TO 7*8-1
  130 FOR y%=0 TO 7
  140 IF POINT(x%*4,y%*4)>0 THEN
  150  x2%=x%*16
  160  y2%=768+30*y%
  170  REM GCOL ((x%+y%+r%)/12) MOD 32+52
  180  GCOL r%*2+64
  190  CIRCLE FILL x2%+16,y2%+16,r%
  200 ENDIF
  210 NEXT
```

Continued ▶

RISC REVUE

◀ **Continued**

```
 220 NEXT
 230 NEXT
 240 *SNEW
 250 MOVE Ø,768
 260 MOVE 1ØØØ,1Ø23
 270 *SGET riscos
 280 *SSAVE PaintDemo
 290 END
```

Listing 3

```
  1Ø REM >GalChanges (RR3)
  2Ø REM Galaxy Collision - Archimedes
Version
  3Ø REM Arc Changes by Ray Porter
  4Ø REM (c) BAU June 199Ø
  41 REM Original program - Andrew Rank
in, BAU July 1989, p.58,95
  7Ø v$="2.ØØ"
  8Ø SOUND OFF
 1ØØ mz%=2:screen%=1:view%=2
 331 PROCdimarrays
 55Ø :
 6Ø1 FOR scrn%=1 TO 2:SYS "OS_Byte",112
,scrn%
 6Ø2 VDU 12,2Ø,19,Ø,4;Ø;23,1,Ø,Ø,Ø,Ø,Ø,
Ø,Ø,Ø
 71Ø PRINTTAB(15,8)p TAB(49,8)s TAB(15,
9)q TAB(49,9)t
 711 NEXT
 79Ø x(I%)=rad*COS(g)
 8ØØ y(I%)=rad*SIN(g)
 81Ø :
 82Ø :
 86Ø NEXT:NEXT:x()=x()+15Ø:y()=y()+1ØØ
 891 PROCsetarrays
 91Ø xa(I%)=xa(I%)^1.5
 92Ø xd(I%)=xd(I%)^1.5
 93Ø NEXT
 94Ø :
 95Ø xa()=m/xa()
 96Ø xd()=n/xd()
 97Ø ax()=ax()*xa():u()=u()+ax():dx()=x
d()*dx():u()=u()+dx()
 98Ø by()=by()*xa():v()=v()+by():ey()=x
d()*ey():v()=v()+ey()
 99Ø cz()=cz()*xa():w()=w()+cz():fz()=x
d()*fz():w()=w()+fz()
 1ØØØ x()=x()+u()
 1Ø1Ø y()=y()+v()
 1Ø2Ø z()=z()+w()
 121Ø key%=INKEY(5):IF T%=stop%+1 PROCwa
it
 1211 CASE key% OF
 122Ø WHEN 8Ø:PROCwait
 123Ø WHEN 73:PROCiterate
 124Ø WHEN 71:PROCsdump:key%=INKEY(5)
 125Ø WHEN 83:RUN
 126Ø WHEN 69:phase%=3:SYS "OS_Byte",113
,screen%:CLS
 1265 ENDCASE
 13ØØ DEF PROCplotgalaxies:SWAP screen%,
view%:SYS "OS_Byte",112,screen%:SYS "OS_
Byte",113,view%
 14ØØ xg()=x()-g:hy()=h-y():iz()=i-z()
 143Ø CIRCLE FILL (d-g)*4.267+32Ø,(h-e)*
4.267+32Ø,12
 146Ø CIRCLE FILL (d-g)*4.267+96Ø,(i-f)*
4.267*mz%+32Ø,12
 1461 xg()=xg()*4.267:xg()=xg()+32Ø:hy()
=hy()*4.267:hy()=hy()+32Ø
 147Ø iz()=iz()*mz%:iz()=iz()*4.267:iz()
=iz()+32Ø
 148Ø VDU 24,Ø;Ø;64Ø;64Ø;:FOR I%=Ø TO st
ars%-1:POINT xg(I%),hy(I%):NEXT
 1481 xg()=xg()+64Ø
 149Ø VDU 24,64Ø;Ø;1279;64Ø;:FOR I%=Ø TO
 stars%-1:POINT xg(I%),iz(I%)
 155Ø POINT A%,B%
 159Ø POINT A%+a*2,B%+b*2:POINT A%-b*2,B
%+a*2
 16ØØ POINT A%-a*2,B%-b*2:POINT A%+b*2,B
%-a*2
 161Ø POINT A%+a,B%+b:POINT A%-b,B%+a
 162Ø POINT A%-a,B%-b:POINT A%+b,B%-a
 166Ø DEF PROCsetarrays
 167Ø xa()=x()-a:yb()=y()-b:zc()=z()-c
 168Ø xa()=xa()*xa():yb()=yb()*yb():zc()
=zc()*zc()
 169Ø xd()=x()-d:ye()=y()-e:zf()=z()-f
 17ØØ xd()=xd()*xd():ye()=ye()*ye():zf()
=zf()*zf()
 171Ø xa()=xa()+yb():xa()=xa()+zc():xa()
=xa()+sf
 172Ø xd()=xd()+ye():xd()=xd()+zf():xd()
=xd()+sf
 173Ø ax()=a-x():dx()=d-x():by()=b-y():e
y()=e-y():cz()=c-z():fz()=f-z()
 1811 SYS "OS_Byte",112,view%
 1891 SYS "OS_Byte",112,view%
 1951 FOR scr%=1 TO 2:SYS "OS_Byte",112,
scr%
 1981 NEXT
 2ØØØ :
 2Ø1Ø DEF PROCdimarrays
 2Ø2Ø DIM hy(stars%),iz(stars%),xg(stars
%),x(stars%),y(stars%)
 2Ø3Ø DIM z(stars%),u(stars%),v(stars%),
w(stars%)
 2Ø4Ø DIM xa(stars%),yb(stars%),zc(stars
%),xd(stars%),ye(stars%),zf(stars%)
 2Ø5Ø DIM ax(stars%),dx(stars%),by(stars
%),ey(stars%),cz(stars%),fz(stars%)
 2Ø6Ø ENDPROC
```

Listing 4

```
  1Ø REM >TimeZones (RR4)
  2Ø REM by Dave Acton
  3Ø REM for Archimedes only
  4Ø REM (c) BAU June 199Ø
  5Ø :
  6Ø MODE 12+128
  7Ø summertime%=TRUE
  8Ø DIM string% 32,code% &1ØØ,place$(7
),off(7)
  9Ø FOR p=Ø TO 7
 1ØØ READ place$(p),off(p)
 11Ø IF summertime% AND p>Ø THEN off(p)
-=1
 12Ø NEXT
 13Ø :
 14Ø FOR pass%=Ø TO 2 STEP 2
 15Ø P%=code%
 16Ø link=14:pc=15
 17Ø [OPT pass%
 18Ø .convert
 19Ø ADR R6,time1
 2ØØ ADR R7,time2
 21Ø CMP RØ,#Ø
 22Ø BLT subtract
 23Ø LDR R1,[R6]
 24Ø ADDS R1,R1,RØ
 25Ø STR R1,[R7]
 26Ø LDRB R1,[R6,#4]
 27Ø ADC R1,R1,#Ø
 28Ø STRB R1,[R7,#4]
 29Ø MOV pc,link
 3ØØ .subtract
 31Ø RSB RØ,RØ,#Ø
 32Ø LDR R1,[R6]
 33Ø SUBS R1,R1,RØ
 34Ø STR R1,[R7]
 35Ø LDRB R1,[R6,#4]
 36Ø SBC R1,R1,#Ø
 37Ø STRB R1,[R7,#4]
 38Ø MOV pc,link
 39Ø :
 4ØØ .time1 EQUD Ø:EQUD Ø
 41Ø .time2 EQUD Ø:EQUD Ø
 42Ø ]
 43Ø NEXT pass%
 44Ø :
 45Ø bank%=1
 46Ø VDU 5
 47Ø REPEAT
 48Ø !time1=3
 49Ø SYS "OS_Word",14,time1
 5ØØ WAIT
 51Ø SYS "OS_Byte",112,bank%
 52Ø SYS "OS_Byte",113,3-bank%
 53Ø CLG
 54Ø FOR clock=Ø TO 7
 55Ø PROCclock(FNx(clock),FNy(clock),pl
ace$(clock),off(clock)*36ØØØØ)
 56Ø NEXT
 57Ø bank%=3-bank%
 58Ø UNTIL FALSE
 59Ø :
 6ØØ DEF PROCclock(ox,oy,name$,A%)
 61Ø GCOL 1
 62Ø CIRCLE ox+16Ø,oy+16Ø,8Ø
 63Ø CIRCLE ox+16Ø,oy+16Ø,16
 64Ø GCOL 7
 65Ø MOVE ox+16Ø-8*LEN(name$),oy+64
 66Ø PRINT name$
 67Ø CALL convert
 68Ø PROCtime("%12:%MI %AM",8)
 69Ø PROChand(ox+16Ø,oy+16Ø,5*VAL(LEFT$
($string%,2)),4Ø)
 7ØØ PROChand(ox+16Ø,oy+16Ø,VAL(MID$($s
tring%,4,2)),7Ø)
 71Ø PROCtime("%W3 %DY %M3 %CE%YR",-32)
 72Ø ENDPROC
 73Ø :
 74Ø DEF PROChand(x,y,n,size)
 75Ø LOCAL dx,dy
 76Ø n=n*6
 77Ø dx=4*SINRAD(n+9Ø)
 78Ø dy=4*COSRAD(n+9Ø)
 79Ø MOVE x+dx,y+dy
 8ØØ MOVE x-dx,y-dy
 81Ø PLOT 85,x+size*SINRAD(n),y+size*CO
SRAD(n)
 82Ø ENDPROC
 83Ø :
 84Ø DEF PROCtime(c$,pos)
 85Ø LOCAL i%
 86Ø SYS "OS_ConvertDateAndTime",time2,
string%,32,c$+CHR$Ø
 87Ø i%=Ø
 88Ø WHILE i%?string%>=32
 89Ø i%+=1
 9ØØ ENDWHILE
 91Ø i%?string%=13
 92Ø MOVE ox+16Ø-8*i%,oy+pos
 93Ø PRINT$string%
 94Ø ENDPROC
 95Ø :
 96Ø DEF FNx(n)=32Ø*(n MOD 4)
 97Ø DEF FNy(n)=7ØØ-512*(n DIV 4)
 98Ø :
 99Ø DATA London,Ø
 1ØØØ DATA Paris,1
 1Ø1Ø DATA Los Angeles,-8
 1Ø2Ø DATA Tokyo,9
 1Ø3Ø DATA New York,-5
 1Ø4Ø DATA Moscow,3
 1Ø5Ø DATA Jamberoo,1Ø
 1Ø6Ø DATA Nakhon Ratchasima,7
```

EIGHT BITS

Listing 1

```
  1Ø REM Intersheet inverted commas
  2Ø REM by Boz Perryman
  3Ø REM for B/B+/M/C with Intersheet
  4Ø REM (c) BAU Jun 9Ø
  5Ø :
  6Ø MODE 7
  7Ø PROCcode
  8Ø OSCLI("SAVE COMMAS "+STR$~start+"
"+STR$~(end+1)+" "+STR$~setup)
  9Ø PRINT"Code saved as COMMAS"'"Use *
COMMAS from Intersheet menu"
 1ØØ END
 11Ø :
 12Ø DEFPROCcode
 13Ø osbyte=&FFF4
 14Ø eventvec=&22Ø
 15Ø FOR pass=Ø TO 2 STEP 2
 16Ø P%=&AØØ
 17Ø [OPT pass
 18Ø .start
 19Ø .code
 2ØØ .saveregs
 21Ø PHP
 22Ø CMP #2
 23Ø BNE restoreP
 24Ø PHA
 25Ø TXA
 26Ø PHA
 27Ø TYA
 28Ø PHA
 29Ø .checkctrl_at
 3ØØ CPY #Ø
 31Ø BNE checkactive
 32Ø LDA #1
 33Ø EOR activeflag
 34Ø STA activeflag
 35Ø .checkactive
 36Ø LDA activeflag
 37Ø BEQ exit
 38Ø .checkreturn
 39Ø CPY #13
 4ØØ BEQ returnpressed
 41Ø CPY #21
 42Ø BNE filter
 43Ø .returnpressed
 44Ø LDA #1
 45Ø STA returnflag
 46Ø BNE exit
 47Ø :
 48Ø .filter
 49Ø CPY #127
 5ØØ BCS exit
 51Ø CPY #ASC"/"
 52Ø BEQ exit
 53Ø CPY #32
 54Ø BCC exit
 55Ø LDA returnflag
 56Ø BEQ exit
 57Ø LDA #138
 58Ø LDX #Ø
 59Ø LDY #ASC""""
 6ØØ JSR osbyte
 61Ø LDA #Ø
 62Ø STA returnflag
 63Ø .exit
 64Ø PLA
 65Ø TAY
 66Ø PLA
 67Ø TAX
 68Ø PLA
 69Ø .restoreP
 7ØØ PLP
 71Ø JMP (oldvec)
 72Ø :
 73Ø .oldvec EQUW Ø
 74Ø .activeflag EQUB 1
 75Ø .returnflag EQUB 1
 76Ø :
 77Ø .setup
 78Ø LDA eventvec
 79Ø STA oldvec
 8ØØ LDA eventvec+1
 81Ø STA oldvec+1
 82Ø SEI
 83Ø LDA #code MOD 256
 84Ø STA eventvec
 85Ø LDA #code DIV 256
 86Ø STA eventvec+1
 87Ø CLI
 88Ø .enable
 89Ø LDA #14
 9ØØ LDX #2
 91Ø JSR osbyte
 92Ø LDA #138
 93Ø LDX #Ø
 94Ø LDY #13
 95Ø JMP osbyte
 96Ø .end
 97Ø ]NEXT
 98Ø ENDPROC
```

Listing 2

```
  1Ø REM Free space map recover
  2Ø REM by David Flannagan
  3Ø REM for B/B+/E/M/C with ADFS
  4Ø REM (c) BAU Jun 9Ø
  5Ø :
  6Ø block=&9ØØ
  7Ø buffer=&AØØ
  8Ø osword=&FFF1
  9Ø REPEAT
 1ØØ S%=Ø
 11Ø INPUT "Size of disc (S/M/L)-: " s$
 12Ø IF s$="S" OR s$="s" THEN S%=&28Ø
 13Ø IF s$="M" OR s$="m" THEN S%=&5ØØ
 14Ø IF s$="L" OR s$="l" THEN S%=&AØØ
 15Ø UNTIL S%
 16Ø PROCclear
 17Ø buffer!&FC=S%
 18Ø buffer?&FF=FNsum(S%)
 19Ø PROCwrite(Ø)
 2ØØ PROCclear
 21Ø buffer!&FB=&A52C
 22Ø buffer?&FF=&D1
 23Ø PROCwrite(1)
 24Ø *ADFS
 25Ø *MAP
 26Ø END
 27Ø :
 28Ø DEFPROCclear
 29Ø FOR A%=Ø TO &FC STEP 4
 3ØØ buffer!A%=Ø
 31Ø NEXT
 32Ø ENDPROC
 33Ø :
 34Ø DEFPROCwrite(S%)
```

Continued ▶

EIGHT BITS

◀ Continued

```
350 block!1=buffer
360 block!5=&A
370 block!8=S%
380 block!&B=&100
390 X%=block MOD 256
400 Y%=block DIV 256
410 A%=&72
420 CALL osword
430 ENDPROC
440 :
450 DEF FNsum(N%)
460 IF N%<256 THEN = N%
470 =FNsum(FNb(N%,1)+FNb(N%,&100)+FNb(
N%,&10000))
480 :
490 DEF FNb(N%,B%)
500 =N% DIV B% AND &FF
```

Listing 3

```
10 REM Machine Code Square Root
20 REM by David Atherton
30 REM for B/B+/E/M/C
40 REM (c) BAU Jun 90
50 :
60 input=&70
70 total=&72
80 counter=&74
90 topodd=&75
100 FOR pass=0 TO 3 STEP 3
110 P%=&900
120 [OPT pass
130 .sqrt
140 LDA #1
150 STA topodd
160 LDA #0
170 STA topodd+1
180 STA total
190 STA total+1
200 STA counter
210 .mainloop
220 LDA topodd
230 CLC
240 ADC total
250 STA total
260 LDA topodd+1
270 ADC total+1
280 STA total+1
290 :
300 CLC
310 LDA topodd
320 ADC #2
330 STA topodd
340 LDA topodd+1
350 ADC #0
360 STA topodd+1
370 :
380 INC counter
390 :
400 LDA total+1
410 CMP input+1
420 BCC mainloop
430 BNE end
440 LDA total
450 CMP input
460 BCC mainloop
470 BEQ end2
480 :
490 .end
500 DEC counter
510 .end2
520 RTS
530 ]
540 NEXT
550 :
560 PRINT "Machine code square root"
570 FOR I%=1 TO 10000
580 !input=I%
590 PRINT "The integer of the square r
oot of ";I%;" is ";
600 CALL sqrt
610 PRINT ;?counter
620 IF GET
630 NEXT
```

Listing 4

```
10 REM Last command repeater
20 REM by Michael Brown
30 REM for B/B+/E/M/C
40 REM (c) BAU Jun 90
50 :
60 xtemp=&70
70 ptr=&71
80 buffer=&700
90 code%=&900
100 mybuffer=code%+&70
110 eventv=&220
120 osbyte=&FFF4
130 tabkey=9
140 :
150 FOR pass%=0 TO 3 STEP 3
160 P%=code%
170 [OPT pass%
180 :
190 PHP
200 PHA
210 TXA
220 PHA
230 TYA
240 PHA
250 CPY #tabkey
260 BEQ tab
270 CPY #&0D
280 BEQ return
290 CPY #&7F
300 BEQ delete
310 CPY #&15
320 BEQ ctrlU
330 INC ptr
340 BNE out
350 .return
360 LDX #0
370 .loop2
380 LDA buffer,X
390 STA mybuffer,X
400 INX
410 CPX ptr
420 BNE loop2
430 LDA #&0D
440 STA mybuffer,X
450 LDA #0
460 STA ptr
470 BEQ out
480 .delete
490 LDA ptr
500 BEQ out
510 DEC ptr
520 JMP out
530 .ctrlU
540 LDA #0
550 STA ptr
560 BEQ out
570 .tab
580 LDX #0
590 .loop
600 STX xtemp
610 LDA mybuffer,X
620 CMP #&0D
630 BEQ end
640 TAY
650 LDA #&8A
660 LDX #0
670 JSR osbyte
680 LDX xtemp
690 INC ptr
700 INX
710 BNE loop
720 .end
730 LDX #0
740 LDY #8
750 LDA #&8A
760 JSR osbyte
770 .out
780 PLA
790 TAY
800 PLA
810 TAX
820 PLA
830 PLP
840 RTS
850 ]
860 NEXT pass%
870 :
880 ?eventv=code% MOD 256
890 eventv?1=code% DIV 256
900 *FX14,2
910 PRINT "Command repeater installed"
920 PRINT "Press TAB to repeat last co
mmand"
930 END
```

GRAPHICS

Listing 1

```
10 REM Moire pattern demonstration
20 REM by David Knell
30 REM for all machines
40 REM (c) BAU June 1990
50 :
60 MODE 0
70 FOR THETA = 0 TO 360
80 MOVE 640,512
90 DRAW 640+640*SIN(RAD(THETA)), 512+
512*COS(RAD(THETA))
100 NEXT
```

Listing 2

```
10 REM Image Manipulation
20 REM by David Knell
30 REM for all machines
40 REM (c) BAU June 1990
50 :
60 REM ImageOpAdd performs a 3x3 oper
ation on a given image.
70 REM Inputs: c% points to a table o
f nine coefficients used to scale
80 REM          the points in the 3x3
window, arranged as:
90 REM           0 1 2
100 REM          3 4 5
110 REM          6 7 8
120 REM
130 REM add%    gives a value to be ad
ded to the sum of the products of the
140 REM         pixel values in the wi
ndow with the coefficients in c%
150 REM
160 REM scale   gives an amount by whi
ch to divide the total produced
170 REM
180 REM abs%    if TRUE, take the abso
lute value of the result
190 REM
200 REM x%, y%  give the size of the i
mage being processed
210 REM Put 3x3 kernel here:
220 :
230 DATA 1, 1, 1
240 DATA 0, 0, 0
250 DATA -1, -1, -1
260 DIM c% 36
270 FOR i%=0 TO 32 STEP 4
280   READ coeff%
290   c%!i% = coeff%
300 NEXT i%
310 REM Reduce 640 and 256 for use on
a BBC Micro!
320 PROCImageOpAdd(c%, 0, 3, TRUE, 640
, 256)
330 END
340 :
350 DEF PROCImageOpAdd(c%, add%, scale
, abs%, x%, y%)
360 LOCAL buf1%, buf2%, buf3%, xx%, yy
%, res%, temp%
370 DIM buf1% 4*(x%+3), buf2% 4*(x%+3)
, buf3% 4*(x%+3)
380 FOR xx%=0 TO x%+1
390  buf1%!(4*xx%) = 0
400 NEXT xx%
410 FOR xx% = 0 TO x%
420  buf2%!(4*xx%+4) = FNReadPixel(xx%
, 0)
430 NEXT xx%
440 buf2%!0 = 0
450 buf2%!(4*x%+8) = 0
460 yy% = 0
470 buf3%!0 = 0
480 buf3%!(4*x%+8) = 0
490 REPEAT
500  FOR xx% = 0 TO x%
510   buf3%!(4*xx%+4) = FNReadPixel(xx
%, yy%+1)
520  NEXT xx%
530  FOR xx% = 1 TO x%+1
540   res% = c%!0*buf1%!(4*xx%-4) + c%
!4*buf1%!(4*xx%) + c%!8*buf1%!(4*xx%+4)
550   res% = res% + c%!12*buf2%!(4*xx%
-4) + c%!16*buf2%!(4*xx%)
560   res% = res% + c%!20*buf2%!(4*xx%
+4) + c%!24*buf3%!(4*xx%-4)
570   res% = res% + c%!28*buf3%!(4*xx%
) + c%!32*buf3%!(4*xx%+4)
580   res% = (res% + add%) / scale
590   IF abs% res% = ABS(res%)
600   PROCWritePixel(xx%-1, yy%, res%)
610  NEXT xx%
620 :
630  temp% = buf1%
640  buf1% = buf2%
650  buf2% = buf3%
660  buf3% = temp%
670  yy% = yy%+1
680 UNTIL yy% > y%
690 ENDPROC
700 :
710 DEF FNReadPixel(x%, y%)
720 =POINT(x%*2, y%*4)
730 DEF PROCWritePixel(x%, y%, c%)
740 GCOL 0, c%
750 PLOT 69, x%*2, y%*4
760 ENDPROC
```

DISCS

Listing 1

```
10 REM >MakeApp
20 REM by Dave Acton
30 REM for Archimedes only
40 REM (c) BAU June 1990
50 :
60 free%=(HIMEM-END-&8000) AND &FFFFF
000
70 DIM w% free%
80 READ app$
90 REPEAT
100 PROCins(app$)
110 INPUT"Enter destination directory:
"app$
120 IF app$="" app$="@"
130 SYS "XOS_File",5,app$ TO type%
140 UNTIL type%=2
150 REPEAT
160 READ file$
170 IF file$<>"*" THEN
180 file$=app$+"."+file$
190 PRINT"Creating file """file$""""
200 READ load%,exec%,olen%,attrib%
210 p%=0
220 d$=""
230 dl%=1
240 WHILE p%<olen%
250 b%=FNb
260 IF b%=130:p%?w%=FNb:p%+=1
270 IF b%>=131 AND b%<=162 THEN
280 n%=b%-128
290 f%=p%-FNb
300 FOR i%=0 TO n%-1
310 ?(w%+p%+i%)=?(w%+f%+i%)
320 NEXT
330 p%+=n%
340 ENDIF
350 IF b%<130 OR b%>162 THEN
```

Continued ▶

DISCS

◀ Continued

```
360 p%?w%=b%:p%+=1
370 ENDIF
380 ENDWHILE
390 SYS "OS_File",0,file$,,,w%,w%+p%
400 SYS "OS_File",1,file$,load%,exec%,,attrib%
410 ENDIF
420 UNTIL file$="*"
430 PRINT'"Files created"
440 END
450 :
460 DEF FNb
470 LOCAL b%,c1%,c2%,i%
480 IF d$="" THEN
490 READ d$,c1%
500 c2%=0
510 FOR i%=1 TO LEN(d$)/2
520 c2%+=EVAL("&"+MID$(d$,2*i%-1,2))
530 NEXT
540 IF c1%<>(c2% MOD 100) PRINT"Error in DATA line ";dl%:END
550 dl%+=1
560 ENDIF
570 b%=EVAL("&"+LEFT$(d$,2))
580 d$=MID$(d$,3)
590 =b%
600 :
610 DEF PROCins(i$)
620 LOCAL i%
630 FOR i%=1 TO LEN(i$)
640 SYS "OS_Byte",138,0,ASC(MID$(i$,i%))
650 NEXT
660 ENDPROC
670 :
680 DATA $.!FILEFIND
690 DATA "!Boot"
700 DATA &FFFFEB42,&29486DFE
710 DATA &20,&3
720 DATA 49636F6E53707269746573,39
730 DATA 203C4F62657924446972 3E,76
740 DATA 2E21871 40A,44
750 DATA "!Run"
760 DATA &FFFFEB42,&45E72334
770 DATA &A2,&3
780 DATA 7C2046696C6546696E6465,26
790 DATA 720A7C20436F7079726967,13
800 DATA 6874204443412031393930,95
810 DATA 0A0A5365748B2524446972,19
820 DATA 203C4F626579840A3E0A2A,47
830 DATA 49636F6E53707269746573,39
840 DATA 203C8E283E2E21881A0A57,74
850 DATA 696D70536C6F74202D6D69,35
860 DATA 6E2036344B8309617884 09,21
870 DATA 0A2A52756E8B532E218310,9
880 DATA 496D616765202 52A300A,52
890 DATA "!Sprites"
900 DATA &FFFFF942,&29496F5F
910 DATA &2E0,&3
920 DATA 0100000108304E4020000,82
930 DATA D4830421666 96C6566696E,13
940 DATA 648318 04871C8323000783,26
950 DATA 282C832C808331 0C833466,64
960 DATA 66666683048607840D8348,30
970 DATA D6DDDDDDD83048607DDDD,16
980 DATA 6D8514829D829982998299,98
990 DATA 82998299D98D1482979314,92
1000 DATA 8297829977777777DD852E,40
1010 DATA 8299892884537D8F14844F,74
1020 DATA 7D829979832FD78F148666,21
1030 DATA 8B50873C8A788A5 0901483,85
1040 DATA 50D790288E509214843290,93
1050 DATA 2886FF9314DD7D778AF066,41
1060 DATA 66666683048607840D83F0,98
1070 DATA FFFFFFFF83048607840D93,88
1080 DATA 149314A228A250A278A2A0,35
1090 DATA A2B4A2DCA2F0A2F08CF000,8
1100 DATA "Templates"
1110 DATA &FFFFEC42,&45E681FA
1120 DATA &3AD,&3
1130 DATA FFFFFFFF0000000830485,88
1140 DATA 075C830DC001000018315,89
1150 DATA 696E666F0D6E744F666622,84
1160 DATA 0D1C020000638329841874,86
1170 DATA 7265650D841C220D7A7F83,16
1180 DATA 182E8730666 96C658534FB,5
1190 DATA 20842B00828283346 48338,37
1200 DATA FE0400003C038A6624070 0,4
1210 DATA 0012000182840702070 10C,10
1220 DATA 0E0C867FFC83880 5868A3D,44
1230 DATA 847D3086848 49C78839084,86
1240 DATA A81383A90983ADA4838C34,87
1250 DATA 83B95483546483C13D3000,48
1260 DATA B70D4B0D7469746C65643E,92
1270 DATA 0DFE829A83D1CC83D97683,92
1280 DATA B48357FF3D6000746839C,74
1290 DATA 46696E6465720D0D842082,20
1300 DATA 98872 0C8844061000782 8B,88
1310 DATA 87641A83F8844084588440,52
1320 DATA 8294872 0829F8784288720,8
1330 DATA 308760608740AF87A41E83,9
1340 DATA F93E83FDD083B18488F883,58
1350 DATA B9190000174E616D653A0D,89
1360 DATA 86A00E83F2829C8720C487,65
1370 DATA 205075727 06F73832383C0,70
1380 DATA 84446887408290874 04175,58
1390 DATA 74686F723A0D884038876 0,3
1400 DATA 848084605665727 3696F6E,30
1410 DATA 854041626F757420746869,61
1420 DATA 73207072 6F6772616D0D84,52
1430 DATA FF20536561726368205574,18
1440 DATA 696C6974790D4420432041,32
1450 DATA 63746F6E2C2031393930 0D,36
1460 DATA 302E39302028313 42D4D61,91
1470 DATA 722D3930290D83FF002C83,79
1480 DATA F86C83E8CC840D83FC8406,89
1490 DATA 2807000002000 1FF070207,21
1500 DATA 0003010C8619FCFFFF0005,42
1510 DATA 86243D833400 82A000084,36
1520 DATA 0784365883F083EF832186,20
1530 DATA 443C556E7469746C6583CC,4
1540 DATA 829E83EB788368D8836C1C,92
1550 DATA 038663D083FB2C83635200,82
1560 DATA 0382848363010C0E976330,20
1570 DATA 8A631883A784631083B306,22
1580 DATA 83B76683BB6483743683C4,62
1590 DATA 8294837C3D61000 7258724,6
1600 DATA 1483D70483DB829C8720CC,77
1610 DATA 87202687 4484A784403087,86
1620 DATA 4060874 0278F40846 06083,60
1630 DATA FD8460196000 1754797065,43
1640 DATA 3A0D85D7FE84608298872 0,50
1650 DATA C88520809120846084 4084,26
1660 DATA 6019610017288 7C40E83EE,95
1670 DATA 46696C652064657461696C,43
1680 DATA 730D0D0D53697A653A0D,49
1690 DATA *
```

Listing 2

```
10 REM >!RunImage
20 REM FileFinder application
30 REM by Dave Acton
40 REM for Archimedes only
50 REM (c) BAU June 1990
60 :
70 DIM q% &500,iconinf% &200,ic% &100,q2% &500,menubuf% &C00
80 DIM useful% &100,dat% &100,code% &800
90 fds%=28
100 bord%=8
110 PROCass
120 SYS "OS_File",5,"<FileFinder$Dir>.!Sprites" TO ,,,,splen%
130 DIM filefindersprites% splen%+4
140 !filefindersprites%=splen%
150 SYS "OS_File",255,"<FileFinder$Dir>.!Sprites",filefindersprites%+4
160 PROCinitflags
170 PROCinitheap
180 $q%="TASK"
190 SYS "Wimp_Initialise",200,!q%,"FileFinder" TO version%,mytask%
200 PROCinitwindows
210 PROCmakefixedmenus
220 filefindericon%=FNiconbar
230 ON ERROR PROCerrbox
240 PROCnewtree
250 REPEAT
260 SYS "Wimp_Poll",0,q% TO reason%
270 CASE reason% OF
280 WHEN 1:PROCredraw(q%)
290 WHEN 2:SYS "Wimp_OpenWindow",,q%
300 WHEN 3:PROCclose(!q%)
310 WHEN 6:PROCcheckmouse(!q%,q%!4,q%!8,q%!12,q%!16,q%!20)
320 WHEN 9:PROCmenuselect(q%)
330 WHEN 17,18:IF q%!16=0 PROCshutdownwimp
340 ENDCASE
350 UNTIL FALSE
360 END
370 :
380 DEF FNgetstr(a%)
390 LOCAL b$
400 WHILE ?a%>=32
410 b$+=CHR$(?a%)
420 a%+=1
430 ENDWHILE
440 =b$
450 :
460 DEF FNtextaddr(hand%,icon%)
470 !iconinf%=hand%
480 iconinf%!4=icon%
490 SYS "Wimp_GetIconState",,iconinf%
500 =iconinf%!28
510 :
520 DEF FNlastbit(s$)
530 WHILE INSTR(s$,":")>0
540 s$=MID$(s$,INSTR(s$,":")+1)
550 ENDWHILE
560 WHILE INSTR(s$,".")>0
570 s$=MID$(s$,INSTR(s$,".")+1)
580 ENDWHILE
590 =s$
600 :
610 DEF PROCredraw(q%)
620 SYS "Wimp_RedrawWindow",,q% TO more%
630 WHILE more%
640 PROCextract(q%)
650 IF !q%=treehand% THEN
660 IF files%=0 THEN
670 MOVE ax0%+bord%,ay0%-bord%
680 PRINT"No files"
690 ELSE
700 PROCgetfirstandlast(line1%,line2%,0,files%-1)
710 PROCshowtree(tree%,filedat%,ax0%,ay0%,line1%,line2%,maxwidth%)
720 ENDIF
730 ENDIF
740 SYS "Wimp_GetRectangle",,q% TO more%
750 ENDWHILE
760 ENDPROC
770 :
780 DEF PROCgetfirstandlast(RETURN first%,RETURN last%,min%,max%)
790 first%=(-(winy1%+bord%) DIV (32+bord%))-1
800 last%=(-(winy0%+bord%) DIV (32+bord%))+1
810 IF first%<min% first%=min%
820 IF last%<min% last%=min%
830 IF first%>max% first%=max%
840 IF last%>max% last%=max%
850 ENDPROC
860 :
870 DEF PROCshowtree(C%,D%,ox%,oy%,A%,B%,G%)
880 LOCAL E%,F%
890 E%=(ox% AND &FFFF) OR (oy%<<16)
900 F%=cursel% AND &FFFFFF
910 IF dispmode%=1 F%+=(1<<31)
920 CALL showtree
930 ENDPROC
940 :
950 DEF PROCcheckmouse(mousex%,mousey%,b%,handle%,icon%,ob%)
960 LOCAL newsel%,type%,h$,l%
970 IF (b% AND &505)>0 AND handle%=treehand% THEN
980 !q%=treehand%
990 SYS "Wimp_GetWindowState",,q%
1000 PROCmainextract(q%)
1010 newsel%=((-(mousey%-ay0%)-bord%) DIV (bord%+32))
1020 IF newsel%>=0 AND newsel%<files% THEN
1030 PROCupdateline(cursel%)
1040 PROCupdateline(newsel%)
1050 A%=0
1060 B%=files%-1
1070 C%=tree%
1080 D%=filedat%
1090 E%=0
1100 F%=(newsel% AND &FFFFFF)+(1<<30)
1110 IF dispmode%=1 F%+=(1<<31)
1120 curplace%=USR(showtree)
1130 curname$=FNgetstr(fullpath)+FNgetstr(curplace%)
1140 $FNtextaddr(fileinfohand%,1)=curname$
1150 $FNtextaddr(fileinfohand%,2)=STR$(curplace%!20)+" bytes"
1160 IF ((curplace%!12) AND &FFF00000)=&FFF00000 THEN
1170 type%=((curplace%!12) AND &FFF00)>>8
1180 h$=RIGHT$("00"+STR$~type%,3)
1190 SYS "XOS_ReadVarVal","File$Type_"+h$,dat%,&100,0,3 TO ,,l%
1200 IF l%>0 THEN dat%?l%=13 ELSE ?dat%=13
1210 $FNtextaddr(fileinfohand%,0)=$dat%+" (&"+h$+")"
1220 ELSE
1230 $FNtextaddr(fileinfohand%,0)="<none>"
1240 ENDIF
1250 IF cursel%=newsel% AND (b% AND 4)>0 THEN OSCLI"WimpTask "+curname$
1260 cursel%=newsel%
1270 ENDIF
1280 ENDIF
1290 IF (b% AND 5)>0 AND handle%=-2 THEN
1300 !q%=treehand%
1310 SYS "Wimp_GetWindowState",,q%
1320 q%!28=-1
1330 IF NOT active% THEN
1340 workw%=q%!12-q%!4
1350 workh%=q%!16-q%!8
1360 q%!4=128
1370 q%!8=768-workh%
1380 q%!12=128+workw%
1390 q%!16=768
1400 q%!20=0
1410 q%!24=0
1420 ENDIF
1430 SYS "Wimp_OpenWindow",,q%
1440 active%=TRUE
1450 ENDIF
1460 IF (b% AND 2)>0 THEN
1470 CASE handle% OF
1480 WHEN -2:
1490 menuhandle%=101
1500 PROCopenmenu(quitmenu%,mousex%-86,176)
1510 WHEN treehand%:
1520 menuhandle%=102
1530 PROCmakemenus
1540 PROCopenmenu(mainmenu%,mousex%-86,mousey%)
1550 ENDCASE
1560 ENDIF
1570 ENDPROC
1580 :
1590 DEF PROCmakefixedmenus
1600 LOCAL i%,l%,p%,f%
1610 menuptr%=menubuf%
1620 menend%=menubuf%+&BFF
1630 ftnames%=-1
1640 ftnums%=-1
1650 SYS "XOS_ReadVarVal","File$Type_###",dat%,&100,0,3 TO ,,l%,p%
1660 i%=0
1670 named%=0
1680 WHILE l%>0
1690 dat%?l%=13
1700 f%=FNevalhex(RIGHT$(FNgetstr(p%),3))
1710 IF f%>=0 THEN
1720 ftnames%=FNextendablock(ftnames%,LEN($dat%)+8)
1730 $(ftnames%+i%)=$dat%+" (&"+STR$~f%+"),"
1740 i%+=LEN($(ftnames%+i%))
1750 ftnums%=FNextendablock(ftnums%,4)
1760 ftnums%!(4*named%)=f%
1770 named%+=1
1780 ENDIF
1790 SYS "XOS_ReadVarVal","File$Type_###",dat%,&100,p%,3 TO ,,l%,p%
1800 ENDWHILE
1810 IF ftnames%<>-1 ntypemenu%=FNmakemen2(ftnames%,"Named type")
1820 typemenu%=FNmakemen("All,"+FNlit(ftnames%<>-1)+FNsub("Named type",ntypemenu%),"File type")
1830 matchmenu%=FNmakemen("|wrisp","String")
1840 searchmenu%=FNmakemen("|wrisp,"+FNsub("Match",matchmenu%)+","+FNsub("File type",typemenu%),"Search")
1850 sortmenu%=FNmakemen("Unsorted,Sorted by name,Sorted by size,Sorted by date","Pathnames")
1860 dispmenu%=FNmakemen("Tree,"+FNsub("Pathnames",sortmenu%),"Display")
1870 itemmenu%=FNmakemen("|winfiInfo,Open parent","Info")
1880 mainmenu%=FNmakemen(FNsub("Search",searchmenu%)+","+FNsub("Display",dispmenu%)+","+FNsub("File",itemmenu%)+",Clear","FileFinder")
1890 quitmenu%=FNmakemen("|winidInfo,Quit","FileFinder")
1900 IF menuptr%>menend% ERROR 0,"Insufficient Menu Space"
1910 PROCsetmenstr(matchmenu%,0,"*")
1920 ENDPROC
1930 :
1940 DEF PROCmakemenus
1950 LOCAL i%
1960 PROCtick(typemenu%,0,searchftype%=-1)
1970 PROCtick(typemenu%,1,namedftype%)
1980 IF named%>0 THEN
1990 IF namedftype% THEN
2000 FOR i%=0 TO named%-1
2010 PROCtick(ntypemenu%,i%,searchftype%=ftnums%!(4*i%))
2020 NEXT
2030 ELSE
2040 PROCtickr(ntypemenu%,0,named%-1,-1)
2050 ENDIF
2060 ENDIF
2070 PROCtickr(dispmenu%,0,1,dispmode%)
2080 IF dispmode%=1 PROCtickr(sortmenu%,0,3,sorttype%) ELSE PROCtickr(sortmenu%,0,3,-1)
2090 PROCsetmenstr(searchmenu%,0,"$")
2100 PROClight(mainmenu%,2,cursel%>=0)
2110 ENDPROC
2120 :
2130 DEF PROCtickr(a%,i1%,i2%,ix%)
2140 LOCAL i%,ia%
2150 ia%=a%+28+24*i1%
2160 FOR i%=i1% TO i2%
2170 IF ix%=i% THEN !ia%=!ia% OR 1 ELSE !ia%=!ia% AND &FFFFFFFE
2180 ia%+=24
2190 NEXT
2200 ENDPROC
2210 :
2220 DEF PROClight(a%,i%,c%)
2230 a%=a%+36+24*i%
2240 IF c% THEN !a%=!a% AND &FFBFFFFF ELSE !a%=!a% OR &00400000
2250 ENDPROC
2260 :
2270 DEF PROCtick(a%,i%,c%)
2280 a%=a%+28+24*i%
2290 IF c% THEN !a%=!a% OR 1 ELSE !a%=!a% AND &FFFFFFFE
2300 ENDPROC
```

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```
2310 :
2320 DEF FNlit(test%)
2330 IF test% THEN ="|lit1" ELSE ="|lit0"
2340 :
2350 DEF FNtick(test%)
2360 IF test% THEN ="|tog1" ELSE ="|tog0"
2370 :
2380 DEF FNsub(m$,m%)="|sub"+RIGHT$("0000000"+STR$(m%),12)+m$
2390 :
2400 DEF PROCmenuitem(text$)
2410 LOCAL menuflags%,iconflags%,submenu%,indlen%,valid%
2420 valid%=-1
2430 ii%=FALSE
2440 indlen%=-1
2450 submenu%=-1
2460 IF text$="" ENDPROC
2470 menuflags%=0
2480 iconflags%=&07000021
2490 WHILE LEFT$(text$,1)="|"
2500 CASE MID$(text$,2,3) OF
2510 WHEN "sub":
2520 submenu%=VAL(MID$(text$,5,12))
2530 text$=MID$(text$,17)
2540 WHEN "lit":
2550 iconflags%+=(1<<22)*(1-VAL(MID$(text$,5,1)))
2560 text$=MID$(text$,6)
2570 WHEN "tog":
2580 menuflags%+=VAL(MID$(text$,5,1))
2590 text$=MID$(text$,6)
2600 WHEN "wri":
2610 CASE MID$(text$,5,2) OF
2620 WHEN "sp":indlen%=255:valid%=-1
2630 ENDCASE
2640 menuflags%+=%100
2650 text$=MID$(text$,7)
2660 WHEN "win":
2670 CASE MID$(text$,5,2) OF
2680 WHEN "id":submenu%=infohand%
2690 WHEN "fi":submenu%=fileinfohand%
2700 ENDCASE
2710 text$=MID$(text$,7)
2720 ENDCASE
2730 ENDWHILE
2740 IF LEN(text$)>menumax% menumax%=LEN(text$)
2750 menuptr%!0=menuflags%
2760 menuptr%!4=submenu%
2770 menuptr%!8=iconflags%
2780 IF LEN(text$)>11 indlen%=LEN(text$)
2790 IF indlen%<0 THEN
2800 $(menuptr%+12)=text$
2810 ELSE
2820 menend%-=(indlen%+1)
2830 menuptr%!8=(menuptr%!8) OR %100000000
2840 menuptr%!12=menend%
2850 menuptr%!16=valid%
2860 menuptr%!20=indlen%
2870 $menend%=text$
2880 ENDIF
2890 menuptr%+=24
2900 ENDPROC
2910 :
2920 DEF PROCsetmenstr(menu%,item%,s$)
2930 $(!(menu%+28+24*item%+12))=s$
2940 ENDPROC
2950 :
2960 DEF FNmenstr(menu%,item%)
2970 =FNgetstr(!(menu%+28+24*item%+12))
2980 :
2990 DEF FNmakemen($useful%,menutitle$)
3000 =FNmakemen2(useful%,menutitle$)
3010 :
3020 DEF FNmakemen2(mendat%,menutitle$)
3030 LOCAL menumax%,wasptr%
3040 wasptr%=menuptr%
3050 menumax%=10
3060 i%=0
3070 menuptr%!20=40
3080 $menuptr%=menutitle$
3090 menuptr%?12=7
3100 menuptr%?13=2
3110 menuptr%?14=7
3120 menuptr%?15=0
3130 maxaddr%=menuptr%+16
3140 menuptr%!24=0
3150 menuptr%+=28
3160 REPEAT
3170 i1%=i%+1
3180 item$=""
3190 WHILE i%?mendat%<>ASC"," AND i%?mendat%>=32
3200 item$+=CHR$(i%?mendat%)
3210 i%+=1
3220 ENDWHILE
3230 IF i%?mendat%=ASC"," i%+=1
3240 PROCmenuitem(item$)
3250 UNTIL i%?mendat%<32
3260 menuptr%!-24=(menuptr%!-24) OR &80
3270 !maxaddr%=menumax%*16+32
3280 =wasptr%
3290 :
3300 DEF PROCopenmenu(m%,x%,y%)
3310 menux%=x%:menuy%=y%
3320 SYS "Wimp_CreateMenu",,m%,x%,y%
3330 ENDPROC
3340 :
3350 DEF FNiconbar
3360 LOCAL ii%
3370 !ic%=-1:ic%!4=0:ic%!8=0:ic%!12=63:ic%!16=68:ic%!20=&2002
3380 $(ic%+24)="!FileFind"
3390 SYS "Wimp_CreateIcon",,ic% TO ii%
3400 =ii%
3410 :
3420 DEF PROCmenuselect(menus%)
3430 CASE menuhandle% OF
3440 WHEN 101:IF !menus%=1 PROCshutdownwimp
3450 WHEN 102:PROCdecodemainmenu
3460 ENDCASE
3470 ENDPROC
3480 :
3490 DEF PROCdecodemainmenu
3500 LOCAL redo%,mode%,i%
3510 SYS "Wimp_GetPointerInfo",,q2%
3520 redo%=(((q2%!8) AND 1)>0)
3530 CASE !menus% OF
3540 WHEN 0:
3550 CASE menus%!4 OF
3560 WHEN 0:PROCbuildtree(FNmenstr(searchmenu%,0),FNmenstr(matchmenu%,0))
3570 WHEN 2:
3580 CASE menus%!8 OF
3590 WHEN 0:namedftype%=FALSE:searchftype%=-1
3600 WHEN 1:IF menus%!12>=0 THEN namedftype%=TRUE:searchftype%=ftnums%!(4*menus%!12)
3610 ENDCASE
3620 ENDCASE
3630 WHEN 1:
3640 CASE menus%!4 OF
3650 WHEN 0:dispmode%=0
3660 WHEN 1:IF menus%!8>=0 sorttype%=menus%!8:dispmode%=1
3670 ENDCASE
3680 PROCupdatetree
3690 WHEN 2:
3700 IF menus%!4=1 THEN
3710 i%=LEN(curname$)
3720 REPEAT
3730 i%-=1
3740 UNTIL MID$(curname$,i%,1)="."
3750 OSCLI"Filer_OpenDir "+LEFT$(curname$,i%-1)
3760 ENDIF
3770 WHEN 3:PROCnewtree
3780 ENDCASE
3790 IF redo% PROCmakemenus:PROCopenmenu(mainmenu%,menux%,menuy%)
3800 ENDPROC
3810 :
3820 DEF PROCupdatetree
3830 IF dispmode%=1 PROCsort(sorttype%)
3840 PROCforceredraw
3850 ENDPROC
3860 :
3870 DEF PROCerrbox
3880 LOCAL what%
3890 SYS "Wimp_DragBox",,-1
3900 !useful%=ERR
3910 $(useful%+4)=REPORT$+" / "+STR$ERL+CHR$0
3920 SYS "Wimp_ReportError",useful%,3,"FileFinder" TO ,what%
3930 IF what%=2 PROCshutdownwimp
3940 ENDPROC
3950 :
3960 DEF PROCshutdownwimp
3970 $q%="TASK"
3980 SYS "Wimp_CloseDown",mytask%,!q%
3990 END
4000 ENDPROC
4010 :
4020 DEF FNcreatewindow(name$)
4030 LOCAL hand%,ii%,ics%,a%
4040 SYS "Wimp_LoadTemplate",,templates%,ind%,indir%+&1FFF,-1,name$,0 TO ,,ind%
4050 templates%!64=filefindersprites%
4060 ics%=templates%!84
4070 IF ics%>0 THEN
4080 FOR ii%=0 TO ics%-1
4090 a%=templates%+88+32*ii%
4100 IF ((a%!16) AND %10)=%10 THEN
4110 a%!16=((a%!16) OR %100000000)
4120 sp$=$(a%+20)
4130 DIM a%!20 12
4140 $(a%!20)=sp$
4150 a%!24=filefindersprites%
4160 a%!28=LEN(sp$)
4170 ENDIF
4180 NEXT
4190 ENDIF
4200 templates%!68=10+(10<<16)
4210 SYS "Wimp_CreateWindow",,templates% TO hand%
4220 =hand%
4230 :
4240 DEF PROCclose(hand%)
4250 IF hand%=treehand% THEN active%=FALSE:PROCnewtree
4260 !q%=hand%
4270 SYS "Wimp_CloseWindow",,q%
4280 ENDPROC
4290 :
4300 DEF PROCextract(q%)
4310 PROCmainextract(q%)
4320 winx0%=q%!28-ax0%:winy0%=q%!32-ay0%
4330 winx1%=q%!36-ax0%:winy1%=q%!40-ay0%
4340 ENDPROC
4350 :
4360 DEF PROCmainextract(q%)
4370 bminx%=q%!4:bminy%=q%!8
4380 bmaxx%=q%!12:bmaxy%=q%!16
4390 scrollx%=q%!20:scrolly%=q%!24
4400 ax0%=bminx%-scrollx%
4410 ay0%=bmaxy%-scrolly%
4420 ENDPROC
4430 :
4440 DEF PROCupdateline(l%)
4450 LOCAL y%
4460 !q2%=treehand%
4470 SYS "Wimp_GetWindowInfo",,q2%
4480 y%=q2%!56-bord%-l%*(32+bord%)+4
4490 SYS "Wimp_ForceRedraw",treehand%,q2%!44,y%-32,q2%!52,y%
4500 ENDPROC
4510 :
4520 DEF PROCforceredraw
4530 !q2%=treehand%
4540 SYS "Wimp_GetWindowInfo",,q2%
4550 SYS "Wimp_ForceRedraw",treehand%,q2%!44,q2%!48,q2%!52,q2%!56
4560 ENDPROC
4570 :
4580 DEF PROCinitwindows
4590 DIM templates% &800,indir% &800
4600 ind%=indir%
4610 SYS "Wimp_OpenTemplate",,"<FileFinder$Dir>.Templates"
4620 treehand%=FNcreatewindow("Tree")
4630 infohand%=FNcreatewindow("Info")
4640 fileinfohand%=FNcreatewindow("FileInfo")
4650 SYS "Wimp_CloseTemplate"
4660 ENDPROC
4670 :
4680 DEF PROCinitflags
4690 searchftype%=-1:namedftype%=FALSE
4700 minsize%=-1:maxsize%=-1
4710 tree%=-1:filedat%=-1
4720 files%=0:active%=FALSE
4730 dispmode%=0:sorttype%=0
4740 cursel%=-1
4750 ENDPROC
4760 :
4770 DEF PROCsetextents
4780 LOCAL width%,depth%,w2%
4790 PROCsetwindowtitle
4800 IF files%=0 THEN
4810 width%=(LEN(windowtitle$)+5)*16
4820 depth%=32+2*bord%
4830 ELSE
4840 width%=2048
4850 depth%=(32+bord%)*files%+bord%
4860 ENDIF
4870 !q2%=treehand%
4880 SYS "Wimp_GetWindowState",,q2%
4890 IF width%<(q2%!12-q2%!4) q2%!12=q2%!4+width%
4900 IF depth%<(q2%!16-q2%!8) q2%!8=q2%!16-depth%
4910 !q%=0:q%!4=-depth%:q%!8=width%:q%!12=0
4920 SYS "Wimp_SetExtent",treehand%,q%
4930 IF active% THEN
4940 q2%!20=0
4950 q2%!24=0
4960 SYS "Wimp_OpenWindow",,q2%
4970 ENDIF
4980 PROCforceredraw
4990 ENDPROC
5000 :
5010 DEF PROCsetwindowtitle
5020 !q2%=treehand%
5030 SYS "Wimp_GetWindowInfo",,q2%
5040 $(q2%!76)=windowtitle$
5050 IF active% THEN
5060 !q2%=treehand%
5070 SYS "Wimp_CloseWindow",,q2%
5080 SYS "Wimp_OpenWindow",,q2%
5090 ENDIF
5100 ENDPROC
5110 :
5120 DEF PROCbuildtree(root$,match$)
5130 LOCAL exists%
5140 IF INSTR(root$,":")<=0 root$="adfs:"+root$
5150 PROCnewtree
5160 SYS "Hourglass_On"
5170 SYS "XOS_File",5,root$ TO exists%
5180 IF exists%<>2 ERROR 17,"No such directory"
5190 tree%=FNdoobj(root$,match$,searchftype%,minsize%,maxsize%)
5200 maxwidth%+=2
5210 SYS "Hourglass_Off"
5220 windowtitle$="FileFinder: "+root$
5230 PROCsetextents
5240 PROCupdatetree
5250 ENDPROC
5260 :
5270 DEF PROCnewtree
5280 PROCwipetree(tree%)
5290 PROCfreeablock(filedat%)
5300 files%=0
5310 maxwidth%=0
5320 cursel%=-1
5330 windowtitle$="FileFinder"
5340 PROCsetextents
5350 ENDPROC
5360 :
5370 DEF PROCwipetree(RETURN tree%)
5380 IF tree%=-1 ENDPROC
5390 PROCwipe(tree%)
5400 tree%=-1
5410 ENDPROC
5420 :
5430 DEF PROCwipe(a%)
5440 LOCAL i%,b%
5450 FOR i%=0 TO a%!8-1
5460 b%=!(a%+12+4*i%)
5470 IF b%>=0 PROCwipe(b%)
5480 NEXT
5490 PROCfreeablock(a%)
5500 ENDPROC
5510 :
5520 DEF FNdoobj(obj$,match$,searchftype%,minsize%,maxsize%)
5530 LOCAL type%,load%,exec%,len%,attrib%,i%,j%,r%,m$,pass%,store%
5540 LOCAL nstore%,items%,fileok%,wasfiles%,done%,ii%
5550 wasfiles%=files%
5560 store%=FNgetablock(12)
5570 store%!4=2
5580 items%=0
5590 i%=0
5600 done%=FALSE
5610 REPEAT
5620 FOR pass%=1 TO 2
5630 IF pass%=1 m$=match$ ELSE m$="*"
5640 SYS "OS_GBPB",10,obj$+CHR$(0),dat%,1,i%,&100,m$+CHR$(0) TO ,,,r%,ii%
5650 IF ii%=-1 THEN done%=TRUE
5660 IF r%=1 THEN
5670 j%=dat%+&14
5680 WHILE ?j%<>0
5690 j%+=1
5700 ENDWHILE
5710 ?j%=13
5720 IF pass%=1 THEN
5730 IF dat%!&10=1 THEN
5740 fileok%=TRUE
5750 IF searchftype%<>-1 THEN
5760 fileok%=FALSE
5770 IF ((!dat%)>>>20)=&FFF THEN
5780 fileok%=(((!dat% AND &FFF00)>>8)=searchftype%)
5790 ENDIF
5800 ENDIF
5810 IF minsize%<>-1 THEN IF dat%!8<minsize% fileok%=FALSE
5820 IF maxsize%<>-1 THEN IF dat%!8>maxsize% fileok%=FALSE
5830 IF fileok% THEN
5840 store%=FNextendablock(store%,4)
5850 !(store%+12+4*items%)=files% OR &FF000000
5860 items%+=1
5870 filedat%=FNextendablock(filedat%,fds%)
5880 $(filedat%+fds%*files%)=$(dat%+&14)+CHR$(0)
5890 !(filedat%+fds%*files%+12)=!dat%
5900 !(filedat%+fds%*files%+16)=dat%!4
5910 !(filedat%+fds%*files%+20)=dat%!8
5920 !(filedat%+fds%*files%+24)=files%
5930 files%+=1
5940 IF LEN(obj$+$(dat%+&14))>maxwidth% maxwidth%=LEN(obj$+$(dat%+&14))
5950 ENDIF
5960 ENDIF
5970 ELSE
5980 IF dat%!&10=2 THEN
5990 nstore%=FNdoobj(obj$+"."+$(dat%+&14),match$,searchftype%,minsize%,maxsize%)
6000 IF nstore%<>-1 THEN
6010 store%=FNextendablock(store%,4)
6020 !(store%+12+4*items%)=nstore%
6030 items%+=1
6040 ENDIF
6050 ENDIF
6060 ENDIF
6070 ENDIF
6080 NEXT pass%
6090 i%+=1
6100 UNTIL done%
6110 IF files%=wasfiles% THEN
6120 PROCfreeablock(store%)
6130 ELSE
```

Continued ▶

DISCS

◀ **Continued**

```
6140 IF obj$<>root$ obj$=FNlastbit(obj$)
6150 !store%=FNgetablock(LEN(obj$)+2)
6160 $!store%=obj$+CHR$(0)
6170 store%!8=items%
6180 ENDIF
6190 =store%
6200 :
6210 DEF PROCinitheap
6220 heapd%=HIMEM
6230 heapsize%=32*1024
6240 SYS "Wimp_SlotSize",-1,-1 TO appsize%
6250 SYS "Wimp_SlotSize",appsize%+heapsize%,-1
6260 SYS "OS_Heap",0,heapd%,,heapsize%
6270 ENDPROC
6280 :
6290 DEF FNgetablock(size%)
6300 LOCAL loc%,ok%,heapfull%,largest%
6310 heapfull%=FALSE
6320 REPEAT
6330 SYS "OS_Heap",1,heapd% TO ,,largest%
6340 IF largest%>=size% THEN
6350 SYS "OS_Heap",2,heapd%,,size% TO ,,loc%
6360 ok%=TRUE
6370 ELSE
6380 heapfull%=FNtrytoextendheap
6390 ENDIF
6400 UNTIL ok% OR heapfull%
6410 IF heapfull% THEN ERROR 0,"FileFinder has run out of memory"
6420 =loc%
6430 :
6440 DEF FNextendablock(loc%,size%)
6450 LOCAL ok%,heapfull%,newloc%
6460 IF loc%<=0 THEN =FNgetablock(size%)
6470 heapfull%=FALSE
6480 REPEAT
6490 SYS "XOS_Heap",4,heapd%,loc%,size% TO ,,newloc%;ok%
6500 ok%=((ok% AND 1)=0)
6510 IF NOT ok% THEN heapfull%=FNtrytoextendheap
6520 UNTIL ok% OR heapfull%
6530 IF heapfull% THEN ERROR 0,"FileFinder has run out of memory"
6540 =newloc%
6550 :
6560 DEF FNtrytoextendheap
6570 LOCAL heapfull%,new%
6580 SYS "XWimp_SlotSize",appsize%+heapsize%+32*1024,-1 TO new%;heapfull%
6590 heapfull%=((heapfull% AND 1)=1)
6600 IF new%=appsize%+heapsize% THEN heapfull%=TRUE
6610 IF NOT heapfull% THEN
6620 heapsize%+=32*1024
6630 SYS "OS_Heap",5,heapd%,,32*1024
6640 ENDIF
6650 =heapfull%
6660 :
6670 DEF PROCfreeablock(RETURN loc%)
6680 IF loc%>0 THEN SYS "OS_Heap",3,heapd%,loc%
6690 loc%=-1
6700 ENDPROC
6710 :
6720 DEF PROCass
6730 temp=0:temp2=1:tree=2:fdat=3
6740 orig=4:select=5:mwid=6:pathpt=7
6750 line=8:count=9:column=10:addr=11
6760 sp=13:link=14:pc=15
6770 FOR pass%=0 TO 2 STEP 2
6780 P%=code%
6790 [OPT pass%
6800 .showtree
6810 CMN tree,#0
6820 MOVEQ pc,link
6830 STR R0,line1
6840 STR R1,line2
6850 STMFD (sp)!,{link}
6860 STR sp,return
6870 ADR pathpt,fullpath
6880 MOV line,#0
6890 STRB line,[pathpt]
6900 MVN column,#(12*16)-1
6910 BL showdir
6920 .abort
6930 LDR sp,return
6940 LDMFD (sp)!,{pc}
6950 :
6960 .showdir
6970 STMFD (sp)!,{tree,column,pathpt,link}
6980 LDR addr,[tree]
6990 CMP column,#0
7000 BLT addpathloop
7010 TST select,#1<<31
7020 BLEQ showdirname
7030 .addpathloop
7040 LDRB temp,[addr],#1
7050 CMP temp,#0
7060 MOVEQ temp,#46
7070 STRB temp,[pathpt],#1
7080 BNE addpathloop
7090 MOV count,#0
7100 STRB count,[pathpt]
7110 ADD column,column,#(12*16)
7120 .showdirloop
7130 STMFD (sp)!,{count}
7140 ADD addr,tree,#12
7150 ADD addr,addr,count,ASL #2
7160 LDRB temp,[addr,#3]
7170 CMP temp,#&FF
7180 BNE isadir
7190 LDR temp,[addr]
7200 BIC temp,temp,#&FF000000
7210 MOV temp2,#fds%
7220 MLA addr,temp,temp2,fdat
7230 TST select,#1<<31
7240 LDRNE line,[addr,#24]
7250 BL showname
7260 ADD line,line,#1
7270 B next
7280 .isadir
7290 STMFD (sp)!,{tree}
7300 LDR tree,[addr]
7310 BL showdir
7320 LDMFD (sp)!,{tree}
7330 .next
7340 LDMFD (sp)!,{count}
7350 ADD count,count,#1
7360 LDR temp,[tree,#8]
7370 CMP count,temp
7380 BNE showdirloop
7390 LDMFD (sp)!,{tree,column,pathpt,link}
7400 MOV temp,#0
7410 STRB temp,[pathpt]
7420 MOV pc,link
7430 :
7440 .showdirname
7450 STMFD (sp)!,{R0-R3,link}
7460 MOV R0,#7
7470 B mainshowname
7480 .showname
7490 STMFD (sp)!,{R0-R3,link}
7500 BIC R0,select,#&FF000000
7510 CMP R0,line
7520 MOVNE R0,#7
7530 BNE mainshowname
7540 TST select,#1<<30
7550 MOVNE R0,addr
7560 BNE abort
7570 MOV R0,#11
7580 .mainshowname
7590 TST select,#1<<30
7600 LDMNEFD (sp)!,{R0-R3,pc}
7610 LDR R1,line1
7620 CMP line,R1
7630 LDRGE R1,line2
7640 CMPGE R1,line
7650 LDMLTFD (sp)!,{R0-R3,pc}
7660 SWI "Wimp_SetColour"
7670 MOV R0,orig,ASL #16
7680 TST select,#1<<31
7690 ADDEQ R1,column,R0,ASR #16
7700 MOVNE R1,R0,ASR #16
7710 ADD R1,R1,#bord%
7720 MOV R0,#bord%+32
7730 MUL R2,R0,line
7740 RSB R2,R2,orig,ASR #16
7750 SUB R2,R2,#bord%
7760 MOV R0,#4
7770 STMFD (sp)!,{R0-R2}
7780 SWI "OS_Plot"
7790 TST select,#1<<31
7800 BNE showinfo
7810 LDMFD (sp)!,{R0-R2}
7820 MOV R0,addr
7830 SWI "OS_Write0"
7840 LDMFD (sp)!,{R0-R3,pc}
7850 .showinfo
7860 ADR R0,fullpath
7870 SWI "OS_Write0"
7880 MOV R0,addr
7890 SWI "OS_Write0"
7900 LDMFD (sp)!,{R0-R2}
7910 ADD R1,R1,mwid,ASL #4
7920 SWI "OS_Plot"
7930 LDR R0,[addr,#20]
7940 ADR R1,string
7950 MOV R2,#8
7960 SWI "OS_BinaryToDecimal"
7970 MOV R0,#0
7980 STRB R0,[R1,R2]
7990 .padwithspaces
8000 SWI &120
8010 ADD R2,R2,#1
8020 CMP R2,#8
8030 BLE padwithspaces
8040 MOV R0,R1
8050 SWI "OS_Write0"
8060 SWI &120
8070 SWI &120
8080 LDR R0,[addr,#12]
8090 MOV R0,R0,LSR #20
8100 ADD R0,R0,#1
8110 CMP R0,#&1000
8120 ADRNE R0,nodatemess
8130 BNE nodate
8140 LDRB R0,[addr,#12]
8150 STRB R0,datebytes+4
8160 LDR R0,[addr,#16]
8170 STR R0,datebytes
8180 ADR R0,datebytes
8190 ADR R1,string
8200 MOV R2,#32
8210 ADR R3,dateformat
8220 SWI "OS_ConvertDateAndTime"
8230 .nodate
8240 SWI "OS_Write0"
8250 LDMFD (sp)!,{R0-R3,pc}
8260 :
8270 .line1  EQUD 0
8280 .line2  EQUD 0
8290 .return EQUD 0
8300 .nodatemess
8310 EQUS "   (No date stamp)    "
8320 EQUB 0
8330 ALIGN
8340 .dateformat
8350 EQUS "%24:%MI:%SE %DY %M3 %CE%YR"
8360 EQUB 0
8370 ALIGN
8380 .string
8390 EQUS STRING$(32," ")
8400 .datebytes
8410 EQUD 0:EQUD 0
8420 :
8430 .comparedate
8440 LDRB R2,[R0,#12]
8450 LDRB R3,[R1,#12]
8460 CMP R3,R2
8470 MOVNE pc,link
8480 LDRB R2,[R0,#19]
8490 LDRB R3,[R1,#19]
8500 CMP R3,R2
8510 MOVNE pc,link
8520 LDR R2,[R0,#16]
8530 LDR R3,[R1,#16]
8540 BIC R2,R2,#&FF000000
8550 BIC R3,R3,#&FF000000
8560 CMP R3,R2
8570 MOV pc,link
8580 :
8590 .comparelen
8600 LDR R2,[R0,#20]
8610 LDR R3,[R1,#20]
8620 CMP R3,R2
8630 MOV pc,link
8640 ]
8650 fullpath=P%
8660 NEXT pass%
8670 ENDPROC
8680 :
8690 DEF PROCsort(stype%)
8700 LOCAL tab%,i%
8710 IF files%<2 ENDPROC
8720 SYS "Hourglass_On"
8730 tab%=FNgetablock(4*files%)
8740 FOR i%=0 TO files%-1
8750 tab%!(4*i%)=filedat%+i%*fds%
8760 NEXT
8770 CASE stype% OF
8780 WHEN 1:SYS "OS_HeapSort",files%,tab%,4
8790 WHEN 2:SYS "OS_HeapSort",files%,tab%,comparelen
8800 WHEN 3:SYS "OS_HeapSort",files%,tab%,comparedate
8810 ENDCASE
8820 FOR i%=0 TO files%-1
8830 !(tab%!(4*i%)+24)=i%
8840 NEXT
8850 PROCfreeablock(tab%)
8860 SYS "Hourglass_Off"
8870 ENDPROC
8880 :
8890 DEF FNevalhex(hex$)
8900 LOCAL t%,v%
8910 $useful%="&"+hex$+CHR$(0)
8920 SYS "XOS_EvaluateExpression",useful%,useful%+&80,&80 TO ,t%,v%
8930 IF t%=0 AND v%>=0 AND v%<=&FFF THEN =v% ELSE =-1
```

CALENDARS

Listing 1

```
10 REM The Newdate Calendar
20 REM by Michael Leete
30 REM for all machines
40 REM (c) BAU June 1990
50 :
60 ON ERROR MODE7:END
70 Kingdomcome=0
80 *FX212,216
90 MODE4
100 VDU19,0,6,0;0;0;
110 VDU19,1,0,0;0;0;
120 PRINTTAB(13,2)"CALENDAR UTILITY"
130 PRINTTAB(14,5)"ESCAPE to Quit"
140 VDU28,0,24,39,7
150 REPEAT
160 N%=0
170 day=0:month=0:year=0:pointer=3:newyearday=0:note$="":Z%=TRUE
180 INPUT'"Enter date as dd,mm,yyyy ";day,month,year
190 IF year<1 VDU7:PRINT'"Sorry, BC dates crack me up!":GOTO 180
200 IF day<1 OR month<1 VDU7:PRINT'"Sorry, no zeroes":GOTO 180
210 IF year>9999 VDU7:PRINT'"If you are serious, alter FNcentennial.":GOTO 180
220 RESTORE 760
230 FOR I%=1 TO month:READ month$:NEXT
240 IF day MOD10=1 AND day<>11 suffix$="st " ELSE IF day MOD10=2 AND day<>12 suffix$="nd " ELSE IF day MOD10=3 AND day<>13 suffix$="rd " ELSE suffix$="th "
250 PRINT'" ";day;suffix$+month$+" ";year;" AD";
260 PROCeaster(year)
270 pointer=pointer+FNreform
280 pointer=pointer+FNcentennial
290 pointer=(pointer+year) MOD 28
300 RESTORE 680:FOR I%=0 TO pointer:READ newyear$:NEXT
310 IF LEFT$(newyear$,1)="L" THEN S%=1 ELSE S%=0
320 Z%=FNtrap
330 newyearday=VAL(RIGHT$(newyear$,1))
340 IF S% day=(newyearday+day++VAL(MID$("034025036146",month,1))-1)MOD7 ELSE day=(newyearday+day+VAL(MID$("033614625035",month,1))-1)MOD7
350 IF S% PRINT" (a Leap year)" ELSE PRINT" (a Common year)"
360 IF NOT Z% VDU7:day=7
370 RESTORE 750:FOR I%=0 TO day:READ d$:NEXT
380 IF year<1990 PRINT" was ";d$;"day" ELSE IF I%=8 PRINT" will not exist." ELSE PRINT" will be ";d$;"day"
390 PRINT'note$
400 UNTIL Kingdomcome
410 END
420 :
430 DEF FNtrap
440 IF day>31 THEN=FALSE
450 IF month=2 AND day>29 THEN=FALSE
460 IF S%=0 AND month=2 AND day>28 THEN=FALSE
470 IF (month=4 OR month=6 OR month=9 OR month=11) AND day>30 THEN=FALSE
480 IF year=1752 AND month=9 AND day<14 AND day>2 note$="Date abolished by Act of Parliament.":=FALSE
490 =TRUE
500 :
510 DEF FNreform
520 IF year<4 THEN =12
530 IF year=4 THEN =-5
540 IF year<1752 THEN =0
```

Continued ▶

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```
  55Ø IF year=1752 AND month<9 THEN =Ø
  56Ø IF year=1752 AND month>9 THEN =8
  57Ø IF year=1752 AND month=9 AND day<3
 THEN =Ø
  58Ø =8
  59Ø :
  6ØØ DEF FNcentennial
  61Ø Y%=Ø
  62Ø IF year>1799 THEN FOR I%=18ØØ TO y
ear STEP 1ØØ ELSE=Y%
  63Ø IF I% MOD 4ØØ<>Ø Y%=Y%+16
  64Ø NEXT
  65Ø IF year MOD1ØØ=Ø AND year MOD4ØØ Y
%=Y%+17
  66Ø =Y%
  67Ø :
  68Ø DATA C1,C2,C3,L4
  69Ø DATA C6,CØ,C1,L2
  7ØØ DATA C4,C5,C6,LØ
  71Ø DATA C2,C3,C4,L5
  72Ø DATA CØ,C1,C2,L3
  73Ø DATA C5,C6,CØ,L1
  74Ø DATA C3,C4,C5,L6
  75Ø DATA Sun,Mon,Tues,Wednes,Thurs,Fri
,Satur,"not a "
  76Ø DATA January,February,March,April,
May,June,July,August,September,October,N
ovember,December
  77Ø :
  78Ø DEF PROCeaster(N%)
  79Ø IF N%<1753 ENDPROC
  8ØØ A%=N% MOD 19
  81Ø B%=N% DIV 1ØØ
  82Ø C%=N% MOD 1ØØ
  83Ø D%=B% DIV 4
  84Ø E%=B% MOD 4
  85Ø F%=(B%+8) DIV 25
  86Ø G%=(B%-F%+1) DIV 3
  87Ø H%=(19*A%+B%-D%-G%+15) MOD 3Ø
  88Ø I%=C% DIV 4
  89Ø K%=C% MOD 4
  9ØØ L%=(32+2*E%+2*I%-H%-K%) MOD 7
  91Ø M%=(A%+11*H%+22*L%) DIV 451
  92Ø P%=(H%+L%-7*M%+114) DIV 31
  93Ø Q%=(H%+L%-7*M%+114) MOD 31
  94Ø IF P%=month AND Q%+1=day THEN note
$=" Easter Day." ELSE note$=""
  95Ø ENDPROC
```

Listing 2

```
   1Ø REM Roman Calculator
   2Ø REM by Michael Leete
   3Ø REM for B/B+/M/C/A
   4Ø REM (c) BAU June 199Ø
   5Ø :
   6Ø *FX212,216
   7Ø m%=Ø:d%=Ø:c%=Ø:l%=Ø:x%=Ø:v%=Ø:i%=Ø
   8Ø mneg%=Ø:dneg%=Ø:cneg%=Ø:lneg%=Ø:xn
eg%=Ø:vneg%=Ø:ineg%=Ø
   9Ø DIM fasti$(34),Month$(12)
  1ØØ DIM menu$(5)
  11Ø Kingdomcome=Ø
  12Ø ON ERROR RUN
  13Ø MODE 4
  14Ø VDU19,Ø,6,Ø;Ø;Ø;
  15Ø VDU19,1,Ø,Ø;Ø;Ø;
  16Ø REPEAT
  17Ø choice=FNmenu(1,5)
  18Ø IF choice=1 PRINTTAB(16,12)"Valete
":VDU23,1,3;Ø;Ø;Ø;:PROCdel(4):MODE 7:END
  19Ø IF choice=2 RUN
  2ØØ IF choice=3 PROCconvert
  21Ø IF choice=4 PROCcalendar
  22Ø IF choice=5 PROCadd
  23Ø UNTIL FALSE
  24Ø :
  25Ø DEF FNmenu(min,max)
  26Ø menu$(1)="Quit      "
  27Ø menu$(2)="Re-start  "
  28Ø menu$(3)="Conversion"
  29Ø menu$(4)="Calendar  "
  3ØØ menu$(5)="Addition  "
  31Ø VDU23,1,Ø;Ø;Ø;Ø;
  32Ø LOCAL menuptr,loop%
  33Ø *FX4,1
  34Ø menuptr=1
  35Ø PROCdouble(128,18,"Press RETURN no
w")
  36Ø PROCdouble(128,2,"AS THE ROMANS DI
D")
  37Ø REPEAT
  38Ø FOR loop%=min TO max
  39Ø IF loop%=menuptr PROCexplain(menup
tr):COLOURØ:COLOUR129 ELSE COLOUR1:COLOU
R128
  4ØØ PRINTTAB(14,3+loop%*2);menu$(loop%
)
  41Ø NEXT
  42Ø COLOUR1:COLOUR128
  43Ø key=GET
  44Ø IF key=139 menuptr=menuptr-1:IF me
nuptr=Ø:menuptr=max
  45Ø IF key=138 menuptr=menuptr+1:IF me
nuptr=max+1 menuptr=1
  46Ø UNTIL key=13
  47Ø *FX4,Ø
  48Ø PROCclosewindow(15,8,len,max+1)
  49Ø =menuptr
  5ØØ :
  51Ø DEF PROCclosewindow(x,y,len,ht)
  52Ø VDU26
  53Ø GCOL Ø,Ø
  54Ø PROCopenwindow(x,y,len,ht)
  55Ø CLS
  56Ø VDU 26
  57Ø GCOL Ø,1
  58Ø ENDPROC
  59Ø :
  6ØØ DEF PROCopenwindow(x,y,len,ht)
  61Ø VDU28,x,y+ht,x+len-1,y
  62Ø PROCrect(x*32-8,1Ø16-(y+ht)*32,len
*32+12,ht*32+12,Ø)
  63Ø PROCrect(x*32,1ØØ8-(y+ht)*32,len*3
2+16,8,1)
  64Ø PROCrect((x+len)*32+8,1ØØ8-(y+ht)*
32,8,ht*32+8,1)
  65Ø ENDPROC
  66Ø :
  67Ø DEF PROCrect(x,y,l,w,f)
  68Ø MOVE x,y
  69Ø DRAW x+1,y
  7ØØ IF f=Ø DRAW x+1,y+w ELSE PLOT 85,x
,y+w
  71Ø IF f=Ø DRAW x+1,y+w ELSE PLOT 85,x
+1,y+w
  72Ø MOVE x,y+w
  73Ø IF f=Ø DRAW x,y ELSE MOVE x,y
  74Ø ENDPROC
  75Ø :
  76Ø DEF PROCdouble(x,y,z$)
  77Ø LOCAL c%
  78Ø c%=&7Ø
  79Ø IF x>8Ø THEN PRINTTAB(2Ø-LENz$ DIV
2,y);:ELSE PRINTTAB(x,y);
  8ØØ FOR loop%=1 TO LEN(z$)
  81Ø ?c%=ASC(MID$(z$,loop%,1))
  82Ø X%=c% MOD 256
  83Ø Y%=c% DIV 256
  84Ø A%=1Ø
  85Ø CALL &FFF1
  86Ø VDU23,128,c%?1,c%?1,c%?2,c%?2,c%?3
,c%?3,c%?4,c%?4,128,1Ø,8,23,128,c%?5,c%?
5,c%?6,c%?6,c%?7,c%?7,c%?8,c%?8,128,11
  87Ø NEXT
  88Ø ENDPROC
  89Ø :
  9ØØ DEF PROCexplain(m)
  91Ø PRINTTAB(Ø,22);STRING$(24Ø," ")
  92Ø PRINTTAB(Ø,22);
  93Ø IF m=1 PRINT"   to Quit and re-set
 the Computer."
  94Ø IF m=2 PRINT"    to start again fr
om the beginning."
  95Ø IF m=3 PRINT"to convert from Arabi
c to Roman numbers"'"and vice versa.  If
 the entry starts"'"with a number, the p
rogram assumes an"'"Arabic notation.  If
 it starts with any"'"letter the Compute
r does its best to"'"find Roman 'letters
'."
  96Ø IF m=4 PRINT"to get the Calendar f
or any date from"'"1 January 1 AD to 13
December 9999 in"'"the Roman form.  The
day of the week"'"is also presented (in
English)."
  97Ø IF m=5 PRINT"to watch a demonstrat
ion addition of"'"any three Roman numera
ls of your own"'"choice. If you enter th
e Roman number"'"incorrectly, the Comput
er does the"'"best it can!"
  98Ø ENDPROC
  99Ø :
 1ØØØ DEF PROCconvert
 1Ø1Ø VDU19,Ø,4,Ø;Ø;Ø;
 1Ø2Ø VDU19,1,3,Ø;Ø;Ø;
 1Ø3Ø PROCdouble(128,2,"CONVERT ROMAN/AR
ABIC NUMBERS")
 1Ø4Ø PRINTTAB(13,5)"ESCAPE to Quit"
 1Ø5Ø VDU28,Ø,24,39,7
 1Ø6Ø REPEAT
 1Ø7Ø M$="":C$="":X$="":I$=""
 1Ø8Ø PRINT'" Enter a Number (Maximum ar
ound 23Ø,ØØØ)"
 1Ø9Ø INPUT"   "B$
 11ØØ E%=LEN(B$)
 111Ø A$=B$
 112Ø IF VAL(A$)<=Ø THEN flag%=Ø:PROCrom
an ELSE flag%=1:PROCarabic
 113Ø PRINT'SPC(3);:IF flag% PRINTB$+" =
 "+M$+C$+X$+I$ ELSE PRINTB$+" = ";R%
 114Ø UNTIL Kingdomcome
 115Ø ENDPROC
 116Ø :
 117Ø DEF PROCthousands
 118Ø E%=E%-3
 119Ø M$=LEFT$(A$,E%):E%=3
 12ØØ M%=VAL(M$)
 121Ø M$=STRING$(M%,"M")
 122Ø A$=RIGHT$(A$,3)
 123Ø ENDPROC
 124Ø :
 125Ø DEF PROCroman
 126Ø REM"Loop Roman to Arabic"
 127Ø R%=Ø:FOR J%=1 TO E%
 128Ø M%=INSTR(A$,"M")
 129Ø D%=INSTR(A$,"D")
 13ØØ C%=INSTR(A$,"C")
 131Ø L%=INSTR(A$,"L")
 132Ø X%=INSTR(A$,"X")
 133Ø V%=INSTR(A$,"V")
 134Ø I%=INSTR(A$,"I")
 135Ø IF M%=1 R%=R%+1ØØØ:m%=m%+1
 136Ø IF D%=1 R%=R%+5ØØ:d%=d%+1
 137Ø IF (C%=1 AND M%=2) OR (C%=1 AND D%
=2) THEN R%=R%-1ØØ:cneg%=cneg%+1
 138Ø IF C%=1 AND M%=Ø AND D%=Ø THEN R%=
R%+1ØØ:c%=c%+1
 139Ø IF L%=1 R%=R%+5Ø:l%=l%+1
 14ØØ IF (X%=1 AND C%=2) OR (X%=1 AND L%
=2) THEN R%=R%-1Ø:xneg%=xneg%+1
 141Ø IF X%=1 AND C%=Ø AND L%=Ø THEN R%=
R%+1Ø:x%=x%+1
 142Ø IF V%=1 R%=R%+5:v%=v%+1
 143Ø IF (I%=1 AND X%=2) OR (I%=1 AND V%
=2) THEN R%=R%-1:ineg%=ineg%+1
 144Ø IF I%=1 AND X%=Ø AND V%=Ø THEN R%=
R%+1:i%=i%+1
 145Ø A$=RIGHT$(A$,E%-J%)
 146Ø NEXT
 147Ø S%=S%+R%
 148Ø !P%=R%:P%=P%+4
 149Ø ENDPROC
 15ØØ :
 151Ø DEF PROCadd
 152Ø CLS
 153Ø VDU19,Ø,4,Ø;Ø;Ø;
 154Ø VDU19,1,3,Ø;Ø;Ø;
 155Ø PROCdouble(128,2,"ROMAN ADDITION")
 156Ø PRINTTAB(13,5)"ESCAPE to Quit"
 157Ø INPUT''"Enter time delay in second
s ",N%
 158Ø m%=Ø:d%=Ø:c%=Ø:l%=Ø:x%=Ø:v%=Ø:i%=Ø
 159Ø mneg%=Ø:dneg%=Ø:cneg%=Ø:lneg%=Ø:xn
eg%=Ø:vneg%=Ø:ineg%=Ø
 16ØØ FOR P%=&78 TO &7Ø STEP -4:!P%=Ø
 161Ø NEXT:P%=&7Ø:S%=Ø
 162Ø VDU28,Ø,3Ø,39,6
 163Ø CLS
 164Ø PROCgrid
 165Ø FOR K%=Ø TO 2
 166Ø VDU28,2,3Ø,39,25+K%
 167Ø PRINT"Add the following (";K%+1;")
";:INPUT" ";A$
 168Ø E%=LEN(A$)
 169Ø PROCroman
 17ØØ PROCprint(Ø,4,8,"M",m%)
 171Ø PROCprint(Ø,1Ø,11,"D",d%):PROCprin
t(1,1Ø,11,"D",dneg%)
 172Ø PROCprint(Ø,13,17,"C",c%):PROCprin
t(1,13,17,"C",cneg%)
 173Ø PROCprint(Ø,19,2Ø,"L",l%):PROCprin
t(1,19,2Ø,"L",lneg%)
 174Ø PROCprint(Ø,22,26,"X",x%):PROCprin
t(1,22,26,"X",xneg%)
 175Ø PROCprint(Ø,28,29,"V",v%):PROCprin
t(1,28,29,"V",vneg%)
 176Ø PROCprint(Ø,31,35,"I",i%):PROCprin
t(1,31,35,"I",ineg%)
 177Ø VDU26
 178Ø NEXT
 179Ø PROCdel(N%)
 18ØØ PROCrationalise
 181Ø VDU28,2,3Ø,38,28
 182Ø P%=&7Ø
 183Ø PRINT"That is ";!P%;"+";P%!4;"+";P
%!8;" = ";S%
 184Ø PRINT" Press any key to do another
 sum."
 185Ø Q$=GET$
 186Ø VDU26:PROCadd
 187Ø ENDPROC
 188Ø :
 189Ø DEF PROCdel(n)
 19ØØ TIME=Ø
 191Ø REPEAT UNTIL TIME>n*1ØØ
 192Ø ENDPROC
 193Ø :
 194Ø :
 195Ø DEF PROCromanyear
 196Ø M$="":C$="":X$="":I$=""
 197Ø E%=LEN(Year$)
 198Ø A$=Year$
 199Ø PROCarabic
 2ØØØ Year$=M$+C$+X$+I$
 2Ø1Ø ENDPROC
 2Ø2Ø :
 2Ø3Ø DEF PROCarabic
 2Ø4Ø IF E%>3 PROCthousands
 2Ø5Ø ON E% GOSUB 399Ø,4Ø9Ø,421Ø
 2Ø6Ø ENDPROC
 2Ø7Ø :
 2Ø8Ø DEF PROCfasti
 2Ø9Ø RESTORE 5Ø9Ø
 21ØØ FOR J%=1 TO 34:READ fasti$(J%):NEX
T
 211Ø FOR J%=1 TO 12:READ Month$(J%):NEX
T
 212Ø IF dd=1 ENDPROC
 213Ø IF S% AND mm=2 AND dd=25 THEN mm =
3:dd=34:ENDPROC
 214Ø IF S% AND mm=2 AND dd>25 THEN mm =
3:dd=dd+4:ENDPROC
 215Ø dd=dd+2
 216Ø PROCpointer
 217Ø ENDPROC
 218Ø :
 219Ø DEF PROCpointer
 22ØØ IF mm=3 OR mm=5 OR mm=7 OR mm=1Ø T
HEN dd=dd-2
 221Ø IF dd<16 ENDPROC
 222Ø IF dd>15 AND (mm=4 OR mm=6 OR mm=9
 OR mm=11) THEN dd=dd+1
 223Ø IF dd>15 AND (mm=3 OR mm=5 OR mm=7
 OR mm=1Ø) THEN dd=dd+2
 224Ø IF dd>15 AND mm=2 THEN dd=dd+3
 225Ø mm=mm+1
 226Ø IF mm>12 mm=1:yy=yy+1
 227Ø Year$=STR$(yy)
 228Ø ENDPROC
 229Ø :
 23ØØ REM"Roman Number Addition"
 231Ø DEF PROCprint(flag%,X1,X2,A$,T%)
 232Ø IF flag% A%=22:B%=18 ELSE A%=15:B%
=11
 233Ø VDU28,X1,A%,X2,B%
 234Ø CLS:IF T%=Ø ENDPROC
 235Ø FOR H%=1 TO T%:PRINTA$;:NEXT
 236Ø ENDPROC
 237Ø :
 238Ø DEF PROCgrid
 239Ø MOVE 25,26Ø:DRAW 1175,26Ø
 24ØØ MOVE 25,48Ø:DRAW 1175,48Ø
 241Ø MOVE 25,7ØØ:DRAW 1175,7ØØ
 242Ø DRAW 1175,24Ø
 243Ø MOVE12Ø,7ØØ:DRAW12Ø,24Ø
 244Ø MOVE3ØØ,7ØØ:DRAW3ØØ,24Ø
 245Ø MOVE4ØØ,7ØØ:DRAW4ØØ,24Ø
 246Ø MOVE595,7ØØ:DRAW595,24Ø
 247Ø MOVE695,7ØØ:DRAW695,24Ø
 248Ø MOVE88Ø,7ØØ:DRAW88Ø,24Ø
 249Ø MOVE975,7ØØ:DRAW975,24Ø
 25ØØ ENDPROC
 251Ø :
 252Ø DEF PROCrationalise
 253Ø REM"IIII
 254Ø PROCreport(4,"I"):PROCdel(N%/2)
 255Ø REPEAT
 256Ø IF i%=Ø GOTO 26ØØ
 257Ø IF ineg%=Ø GOTO 265Ø
 258Ø PROCreport(1,"I"):PROCdel(N%/2)
 259Ø i%=i%-1:ineg%=ineg%-1
 26ØØ IF i%-ineg%<-1:PROCreport(2,"V"):P
ROCdel(N%/2):i%=i%+5:vneg%=vneg%+1
 261Ø PROCprint(Ø,31,35,"I",i%)
 262Ø PROCprint(1,31,35,"I",ineg%)
 263Ø PROCprint(1,28,29,"V",vneg%)
 264Ø PROCdel(N%)
 265Ø UNTIL i%=Ø OR ineg%=Ø
 266Ø REPEAT
 267Ø IF i%=4 THEN i%=Ø:ineg%=1:v%=v%+1
 268Ø IF i%>4 PROCreport(3,"V"):PROCdel(
N%/2):i%=i%-5:v%=v%+1
 269Ø PROCprint(Ø,31,35,"I",i%):PROCprin
t(1,31,35,"I",ineg%)
 27ØØ PROCprint(Ø,28,29,"V",v%)
 271Ø PROCdel(N%)
 272Ø UNTIL i%<4
 273Ø :
 274Ø REM"VVVV
 275Ø PROCreport(4,"V"):PROCdel(N%/2)
 276Ø REPEAT
 277Ø IF v%=Ø GOTO 281Ø
 278Ø IF vneg%=Ø GOTO 286Ø
 279Ø PROCreport(1,"V"):PROCdel(N%/2)
 28ØØ v%=v%-1:vneg%=vneg%-1
 281Ø IF vneg%>v% THEN PROCreport(2,"X")
:PROCdel(N%/2):v%=v%+2:xneg%=xneg%+1
 282Ø PROCprint(Ø,28,29,"V",v%)
 283Ø PROCprint(1,28,29,"V",vneg%)
 284Ø PROCprint(1,22,26,"X",xneg%)
 285Ø PROCdel(N%)
 286Ø UNTIL v%=Ø OR vneg%=Ø
 287Ø REPEAT
 288Ø IF v%>1 PROCreport(3,"X"):PROCdel(
N%/2):v%=v%-2:x%=x%+1
 289Ø PROCprint(Ø,28,29,"V",v%):PROCprin
t(1,28,29,"V",vneg%)
 29ØØ PROCprint(Ø,22,26,"X",x%)
 291Ø PROCdel(N%)
 292Ø UNTIL v%<2
 293Ø :
 294Ø REM"XXXX
 295Ø PROCreport(4,"X"):PROCdel(N%/2)
 296Ø REPEAT
 297Ø IF x%=Ø GOTO 3Ø1Ø
 298Ø IF xneg%=Ø GOTO 3Ø6Ø
 299Ø PROCreport(1,"X"):PROCdel(N%/2)
 3ØØØ x%=x%-1:xneg%=xneg%-1
 3Ø1Ø IF x%-xneg%<-1:PROCreport(2,"L"):P
ROCdel(N%/2):x%=x%+5:lneg%=lneg%+1
 3Ø2Ø PROCprint(Ø,22,26,"X",x%)
 3Ø3Ø PROCprint(1,22,26,"X",xneg%)
```

Continued ▶

CALENDARS

◀ Continued

```
 3Ø4Ø PROCprint(1,19,2Ø,"L",lneg%)
 3Ø5Ø PROCdel(N%)
 3Ø6Ø UNTIL x%=Ø OR xneg%=Ø
 3Ø7Ø REPEAT
 3Ø8Ø IF x%=4 THEN x%=Ø:xneg%=1:l%=l%+1
 3Ø9Ø IF x%>4 PROCreport(3,"L"):PROCdel(
N%/2):x%=x%-5:l%=l%+1
 31ØØ PROCprint(Ø,22,26,"X",x%):PROCprin
t(1,22,26,"X",xneg%)
 311Ø PROCprint(Ø,19,2Ø,"L",l%)
 312Ø PROCdel(N%)
 313Ø UNTIL x%<4
 314Ø :
 315Ø REM"LLLL
 316Ø PROCreport(4,"L"):PROCdel(N%/2)
 317Ø REPEAT
 318Ø IF l%=Ø GOTO 322Ø
 319Ø IF lneg%=Ø GOTO 327Ø
 32ØØ PROCreport(1,"L"):PROCdel(N%/2)
 321Ø l%=l%-1:lneg%=lneg%-1
 322Ø IF lneg%>l% THEN PROCreport(2,"C")
:PROCdel(N%/2):l%=l%+2:cneg%=cneg%+1
 323Ø PROCprint(Ø,19,2Ø,"L",l%)
 324Ø PROCprint(1,19,2Ø,"L",lneg%)
 325Ø PROCprint(1,13,17,"C",cneg%)
 326Ø PROCdel(N%)
 327Ø UNTIL l%=Ø OR lneg%=Ø
 328Ø REPEAT
 329Ø IF l%>1 THEN PROCreport(3,"C"):PRO
Cdel(N%/2):l%=l%-2:c%=c%+1
 33ØØ PROCprint(Ø,19,2Ø,"L",l%):PROCprin
t(1,19,2Ø,"L",lneg%)
 331Ø PROCprint(Ø,13,17,"C",c%)
 332Ø PROCdel(N%)
 333Ø UNTIL l%<2
 334Ø :
 335Ø REM"CCCC
 336Ø PROCreport(4,"C"):PROCdel(N%/2)
 337Ø REPEAT
 338Ø IF c%=Ø GOTO 342Ø
 339Ø IF cneg%=Ø GOTO 347Ø
 34ØØ PROCreport(1,"C"):PROCdel(N%/2)
 341Ø c%=c%-1:cneg%=cneg%-1
 342Ø IF c%-cneg%<-1:PROCreport(2,"D"):P
ROCdel(N%/2):c%=c%+5:dneg%=dneg%+1
 343Ø PROCprint(Ø,13,17,"C",c%)
 344Ø PROCprint(1,13,17,"C",cneg%)
 345Ø PROCprint(1,1Ø,11,"D",dneg%)
 346Ø PROCdel(N%)
 347Ø UNTIL c%=Ø OR cneg%=Ø
 348Ø REPEAT
 349Ø IF c%=4 THEN c%=Ø:cneg%=1:d%=d%+1
 35ØØ IF c%>4 PROCreport(3,"D"):PROCdel(
N%/2):c%=c%-5:d%=d%+1
 351Ø PROCprint(Ø,13,17,"C",c%):PROCprin
t(1,13,17,"C",cneg%)
 352Ø PROCprint(Ø,1Ø,11,"D",d%)
 353Ø PROCdel(N%)
 354Ø UNTIL c%<4
 355Ø :
 356Ø REM"DDDD
 357Ø PROCreport(4,"D"):PROCdel(N%/2)
 358Ø REPEAT
 359Ø IF d%=Ø GOTO 363Ø
 36ØØ IF dneg%=Ø GOTO 368Ø
 361Ø PROCreport(1,"D"):PROCdel(N%/2)
 362Ø d%=d%-1:dneg%=dneg%-1
 363Ø IF dneg%>d% THEN PROCreport(2,"M")
:PROCdel(N%/2):d%=d%+2:mneg%=mneg%+1
 364Ø PROCprint(Ø,1Ø,11,"D",d%)
 365Ø PROCprint(1,1Ø,11,"D",dneg%)
 366Ø PROCprint(1,4,8,"M",mneg%)
 367Ø PROCdel(N%)
 368Ø UNTIL d%=Ø OR dneg%=Ø
 369Ø REPEAT
 37ØØ IF d%>1 PROCreport(3,"M"):PROCdel(
N%/2):d%=d%-2:m%=m%+1
 371Ø PROCprint(Ø,1Ø,11,"D",d%):PROCprin
t(1,1Ø,11,"D",dneg%)
 372Ø PROCprint(Ø,4,8,"M",m%)
 373Ø UNTIL d%<2
 374Ø :
 375Ø REM"MMMM
 376Ø PROCreport(4,"M"):PROCdel(N%/2)
 377Ø REPEAT
 378Ø IF mneg%=Ø ENDPROC
 379Ø PROCreport(1,"M"):PROCdel(N%/2)
 38ØØ m%=m%-1:mneg%=mneg%-1
 381Ø PROCprint(Ø,4,8,"M",m%)
 382Ø PROCprint(1,4,8,"M",mneg%)
 383Ø UNTIL mneg%=Ø
 384Ø REM VDU26
 385Ø ENDPROC
 386Ø :
 387Ø DEF PROCreport(T,T$)
 388Ø VDU28,2,3Ø,39,28:CLS
 389Ø IF T=Ø PRINTSPC(2Ø)
 39ØØ IF T=1 PRINT"Cancel negative ";T$;
"'s"
 391Ø IF T=2 PRINT"Borrow from ";T$
 392Ø IF T=3 PRINT"Carry to ";T$
 393Ø IF T=4 PRINT"Check ";T$;"'s"
 394Ø IF T=5 PRINT"Press 'Q' to quit or
any other key."
 395Ø VDU26
 396Ø ENDPROC
 397Ø :
 398Ø REM"Units"
 399Ø I$=RIGHT$(A$,1)
 4ØØØ I%=VAL(I$):IF I%=Ø I$="":RETURN
 4Ø1Ø IF I%<4 I$=STRING$(I%,"I")
 4Ø2Ø IF I%=4 I$="IV"
 4Ø3Ø IF I%=5 I$="V"
 4Ø4Ø IF I%>5 AND I%<9 I$="V"+STRING$(I%
-5,"I")
 4Ø5Ø IF I%=9 I$="IX"
 4Ø6Ø RETURN
 4Ø7Ø :
 4Ø8Ø REM"Tens"
 4Ø9Ø X$=LEFT$(RIGHT$(A$,2),1)
 41ØØ X%=VAL(X$)
 411Ø IF X%=Ø X$="":GOSUB 399Ø
 412Ø IF X%<4 X$=STRING$(X%,"X")
 413Ø IF X%=4 X$="XL"
 414Ø IF X%=5 X$="L"
 415Ø IF X%>5 AND X%<9 X$="L"+STRING$(X%
-5,"X")
 416Ø IF X%=9 X$="XC"
 417Ø GOSUB 399Ø
 418Ø RETURN
 419Ø :
 42ØØ REM"Hundreds"
 421Ø C$=LEFT$(A$,1)
 422Ø C%=VAL(C$)
 423Ø IF C%=Ø C$="":GOSUB 4Ø9Ø
 424Ø IF C%<4 C$=STRING$(C%,"C")
 425Ø IF C%=4 C$="CD"
 426Ø IF C%=5 C$="D"
 427Ø IF C%>5 AND C%<9 C$="D"+STRING$(C%
-5,"C")
 428Ø IF C%=9 C$="CM"
 429Ø GOSUB 4Ø9Ø
 43ØØ RETURN
 431Ø :
 432Ø DEF PROCcalendar
 433Ø PROCdouble(128,2,"CALENDARIUM")
 434Ø PRINTTAB(14,5)"ESCAPE to Quit"
 435Ø VDU28,Ø,24,39,7
 436Ø REPEAT
 437Ø Year$=STRING$(1Ø," "):AUC$=Year$
 438Ø day=Ø:month=Ø:year=Ø:pointer=3:new
yearday=Ø:note$="":Z%=TRUE
 439Ø INPUT'"Enter date as dd,mm,yyyy ";
day,month,year
 44ØØ IF year<1 VDU7:PRINT'"Sorry, BC da
tes crack me up!":GOTO 439Ø
 441Ø IF day<1 OR month<1 VDU7:PRINT'"So
rry, no zeroes":GOTO 439Ø
 442Ø IF year>9999 VDU7:PRINT'"If you ar
e serious, alter FNcentennial.":GOTO 439
Ø
 443Ø Y%=year
 444Ø AUC%=Y%+753
 445Ø Year$=STR$(AUC%)
 446Ø PROCromanyear
 447Ø AUC$=Year$
 448Ø Year$=STR$(Y%)
 449Ø PROCromanyear
 45ØØ RESTORE 5Ø7Ø
 451Ø FOR I%=1 TO month:READ month$:NEXT
 452Ø IF day MOD1Ø=1 AND day<>11 suffix$
="st " ELSE IF day MOD1Ø=2 AND day<>12 s
uffix$="nd " ELSE IF day MOD1Ø=3 AND day
<>13 suffix$="rd " ELSE suffix$="th "
 453Ø PRINT'" ";day;suffix$+month$+" ";y
ear;" AD";
 454Ø dd=day:mm=month:yy=year
 455Ø pointer=pointer+FNreform
 456Ø pointer=pointer+FNcentennial
 457Ø pointer=(pointer+year) MOD 28
 458Ø RESTORE 499Ø:FOR I%=Ø TO pointer:R
EAD newyear$:NEXT
 459Ø IF LEFT$(newyear$,1)="L" THEN S%=1
 ELSE S%=Ø
 46ØØ Z%=FNtrap
 461Ø newyearday=VAL(RIGHT$(newyear$,1))
 462Ø IF S% day=(newyearday+day++VAL(MID
$("Ø34Ø25Ø36146",month,1))-1)MOD7 ELSE d
ay=(newyearday+day+VAL(MID$("Ø33614625Ø3
5",month,1))-1)MOD7
 463Ø IF S% PRINT" (a Leap year)" ELSE P
RINT" (a Common year)"
 464Ø IF NOT Z% VDU7:day=7
 465Ø RESTORE 5Ø6Ø:FOR I%=Ø TO day:READ
d$:NEXT
 466Ø IF year<199Ø PRINT" was ";d$;"day"
 ELSE IF I%=8 PRINT" will not exist." EL
SE PRINT" will be ";d$;"day"
 467Ø PROCfasti
 468Ø IF I%<>8 PRINT'"  ";fasti$(dd);"."
;Month$(mm);". ";Year$
 469Ø PRINT'"  (";AUC$;" Ab Urbe Condita
)"
 47ØØ PRINT'note$
 471Ø UNTIL Kingdomcome
 472Ø ENDPROC
 473Ø :
 474Ø DEF FNtrap
 475Ø IF day>31 THEN=FALSE
 476Ø IF month=2 AND day>29 THEN=FALSE
 477Ø IF S%=Ø AND month=2 AND day>28 THE
N=FALSE
 478Ø IF (month=4 OR month=6 OR month=9
OR month=11) AND day>3Ø THEN=FALSE
 479Ø IF year=1752 AND month=9 AND day<1
4 AND day>2 note$="Date abolished by Act
 of Parliament.":=FALSE
 48ØØ =TRUE
 481Ø :
 482Ø DEF FNreform
 483Ø IF year<4 THEN =12
 484Ø IF year=4 THEN =-5
 485Ø IF year<1752 THEN =Ø
 486Ø IF year=1752 AND month<9 THEN =Ø
 487Ø IF year=1752 AND month>9 THEN =8
 488Ø IF year=1752 AND month=9 AND day<3
 THEN =Ø
 489Ø =8
 49ØØ :
 491Ø DEF FNcentennial
 492Ø Y%=Ø
 493Ø IF year>1799 THEN FOR I%=18ØØ TO y
ear STEP 1ØØ ELSE=Y%
 494Ø IF I% MOD 4ØØ<>Ø Y%=Y%+16
 495Ø NEXT
 496Ø IF year MOD1ØØ=Ø AND year MOD4ØØ Y
%=Y%+17
 497Ø =Y%
 498Ø :
 499Ø DATA C1,C2,C3,L4
 5ØØØ DATA C6,CØ,C1,L2
 5Ø1Ø DATA C4,C5,C6,LØ
 5Ø2Ø DATA C2,C3,C4,L5
 5Ø3Ø DATA CØ,C1,C2,L3
 5Ø4Ø DATA C5,C6,CØ,L1
 5Ø5Ø DATA C3,C4,C5,L6
 5Ø6Ø DATA Sun,Mon,Tues,Wednes,Thurs,Fri
,Satur,"not a "
 5Ø7Ø DATA January,February,March,April,
May,June,July,August,September,October,N
ovember,December
 5Ø8Ø :
 5Ø9Ø DATA Kalendis,VI Non,V Non,IV Non,
III Non,Pr.Non,Nonis,VIII Id,VII Id,VI I
d,V Id,IV Id,III Id,Pr.Id,Idibus,XIX Kal
,XVIII Kal,XVII Kal,XVI Kal,XV Kal,XIV K
al,XIII Kal
 51ØØ DATA XII Kal,XI Kal,X Kal,IX Kal,V
III Kal,VII Kal,VI Kal,V Kal,IV Kal,III
Kal,Pr.Kal,bis VI Kal
 511Ø DATA Ian,Feb,Mar,Apr,Mai,Iun,Iul(Q
ui),Aug(Sex),Sep,Oct,Nov,Dec
```

S.W.R. UTILITIES

Listing 1

```
  1ØREM DROPKICK header (Listing 1)
  2ØREM by Jeff Tullin
  3ØREM for Bas2 B/B+/E/M/C with SWR
  4ØREM (c) BAU 199Ø
  5Ø:
  6Ø MODE6
  7Ø:
  8Ø osasci=&FFE3
  9Ø osnwl=&FFE7
 1ØØ accum=&7Ø
 11Ø length=&71
 12Ø string=&72
 13Ø address=&74
 14Ø currentstring=&76
 15Ø:
 16Ø FOR opt = 4 TO 6 STEP 2
 17Ø P%=&8ØØØ:O%=&3ØØØ
 18Ø [OPT opt
 19Ø:
 2ØØ JMP  osnwl
 21Ø JMP  entry
 22Ø EQUB (&82)
 23Ø EQUB (copy)
 24Ø EQUB (Ø)
 25Ø.title
 26Ø EQUS ("DROPKICK SWR Utility")
 27Ø EQUB (13)
 28Ø.copy
 29Ø EQUB (Ø)
 3ØØ EQUS ("(C) 1989 Jeff Tullin")
 31Ø EQUB (Ø)
 32Ø EQUB (13)
 33Ø EQUS ("    Syntax: *SEEK <text>")
 34Ø EQUB (13)
 35Ø EQUS ("    Load data into SWR at &
82ØØ")
 36Ø EQUB (13)
 37Ø EQUS ("    Current data: ")
 38Ø EQUB (Ø)
 39Ø.end
 4ØØ EQUS ("No (more) records found")
 41Ø EQUB (13)
 42Ø:
 43Ø.entry
 44Ø STA accum
 45Ø LDA &F3
 46Ø PHA
 47Ø LDA &F2
 48Ø PHA
 49Ø TYA
 5ØØ PHA
 51Ø TXA
 52Ø PHA
 53Ø LDX  #6
 54Ø.savezeropage
 55Ø LDA  &71,X
 56Ø PHA
 57Ø DEX
 58Ø BPL  savezeropage
 59Ø:
 6ØØ LDA  accum
 61Ø CMP# 3
 62Ø BEQ  break
 63Ø CMP# 9
 64Ø BEQ  help
 65Ø CMP# 4
 66Ø BEQ  starcom
 67Ø:
 68Ø.tobasic
 69Ø LDX# Ø
 7ØØ.restorezeropage
 71Ø PLA
 72Ø STA  &71,X
 73Ø INX
 74Ø CPX# 7
 75Ø BNE  restorezeropage
 76Ø PLA
 77Ø TAX
 78Ø PLA
 79Ø TAY
 8ØØ PLA
 81Ø STA  &F2
 82Ø PLA
 83Ø STA  &F3
 84Ø LDA  accum
 85Ø RTS
 86Ø:
 87Ø.printrecord
 88Ø TYA
 89Ø PHA
 9ØØ LDY# Ø
 91Ø.prloop
 92Ø LDA  (currentstring),Y
 93Ø JSR  osasci
 94Ø CMP# 13
 95Ø BEQ  out
 96Ø CMP# Ø
 97Ø BEQ  out
 98Ø INC  currentstring
 99Ø BNE  prloop
1ØØØ INC  currentstring+1
1Ø1Ø BNE  prloop
1Ø2Ø.out
1Ø3Ø INC  currentstring
1Ø4Ø BNE  ok
1Ø5Ø INC  currentstring+1
1Ø6Ø.ok
1Ø7Ø LDA  currentstring
1Ø8Ø STA  address
1Ø9Ø LDA  currentstring+1
11ØØ STA  address+1
111Ø PLA
112Ø TAY
113Ø RTS
114Ø:
115Ø.help
```

Continued ▶

S.W.R. UTILITIES

◀ Continued

```
1160.break
1170 CMP# 3
1180 BEQ  hello
1190 LDA  (&F2),Y
1200 CMP# 13
1210 BEQ  hello
1220 JMP  tobasic
1230:
1240.hello
1250 PHA  ,
1260 LDA# (title MOD 256)
1270 STA  currentstring
1280 LDA# (title DIV 256)
1290 STA  currentstring+1
1300 JSR  printrecord
1310 PLA
1320 CMP# 3
1330 BEQ  morethanhelp
1340 LDX# 6
1350.extratext
1360 JSR  printrecord
1370 DEX
1380 BNE  extratext
1390 JSR  filename
1400.morethanhelp
1410 JSR  osnwl
1420 JMP  tobasic
1430:
1440.command
1450 EQUS ("SEEK")
1460:
1470.starcom
1480 LDX# 0
1490.checkcommand
1500 LDA  (&F2),Y
1510 AND# 223
1520 CMP  command,X
1530 BNE  notforme
1540 INX
1550 INY
1560 LDA  (&F2),Y
1570 CMP# ASC"."
1580 BEQ  abbreviation
1590 CPX# 4
1600 BEQ  action
1610 BNE  checkcommand
1620:
1630.notforme
1640 JMP  tobasic
1650:
1660.abbreviation
1670 INY
1680.action
1690.removespaces
1700 LDA  (&F2),Y
1710 CMP# 32
1720 BNE  text
1730 INY
1740 CLC
1750 BCC  removespaces
1760.text
1770 CLC
1780 TYA
1790 ADC  &F2
1800 STA  string
1810 LDA  &F3
1820 ADC# 0
1830 STA  string+1
1840
1850 LDA# 0
1860 STA  address
1870 LDA# &82
1880 STA  address+1
1890:
1900 LDY# 255
1910.findlength
1920 INY
1930 LDA  (string),Y
1940 CMP# 13
1950 BNE  findlength
1960 STY  length
1970 :
1980.newrecord
1990 LDA  address
2000 STA  currentstring
2010 LDA  address+1
2020 STA  currentstring+1
2030:
2040.scan
2050 LDY# 0
2060 LDA  (address),Y
2070 CMP# ASC("|")
2080 BEQ  exit
2090 CMP  (string),Y
2100 BEQ  remainder
2110.nextbyte
2120 CLC
2130 INC  address
2140 BNE  nocarry
2150 INC  address+1
2160.nocarry
2170 LDA  (address),Y
2180 CMP# 13
2190 BNE  scan
2200 INC  address
2210 BNE  newrecord
2220 INC  address+1
2230 BNE  newrecord
2240:
2250.remainder
2260 LDY  length
2270 DEY
2280.check
2290 LDA  (address),Y
2300 CMP  (string),Y
2310 BNE  nextbyte
2320 CPY# 0
2330 BEQ  suitable
2340 DEY
2350 CLC
2360 BCC  check
2370.suitable
2380 JSR  printrecord
2390 JMP  scan
2400.exit
2410 LDA# (end MOD 256)
2420 STA  currentstring
2430 LDA# (end DIV 256)
2440 STA  currentstring+1
2450 JSR  printrecord
2460 JSR  osnwl
2470 LDA #0
2480 STA  accum
2490 JMP  tobasic
2500:
2510.filename
2520 LDA# &82
2530 STA  address+1
2540 LDA# 0
2550 STA  address
2560 TAY
2570.findname
2580 LDA  (address),Y
2590 CMP# ASC"|"
2600 BEQ  found
2610 INC  address
2620 BNE  findname
2630 INC  address+1
2640 BNE  findname
2650.found
2660 INY
2670.printfilename
2680 LDA  (address),Y
2690 CMP# 13
2700 BEQ  endoftitle
2710 CMP# 32
2720 BCC  nogood
2730 CMP# 123
2740 BCS  nogood
2750 JSR  osasci
2760 INY
2770 CPY# 16
2780 BCC  printfilename
2790.endoftitle
2800 JMP  osnwl
2810.nogood
2820 INY
2830 BNE  printfilename
2840:
2850 NOP:NOP
2860 EQUS  "|None"
2870 EQUB  (13)
2880]
2890 NEXT
2900:
2910:
2920*SAVE "header" 3000 +208 8000 8000
```

Listing 2

```
   10REM DROPKICK (Listing 2)
   20REM by Jeff Tullin
   30REM any Acorn machine
   40REM (c) BAU 1990
   50:
   60 file=OPENOUT "t/phone"
   70 REPEAT
   80 READ A$
   90 FOR X=1 TO LEN(A$)
  100 BPUT#file,ASC(MID$(A$,X,1))
  110 NEXT
  120 BPUT#file,13
  130 UNTIL LEFT$(A$,1)="|"
  140 CLOSE#file
  150
  160 DATA "GEORGE 01234567"
  170 DATA "JENNY  091987654"
  180 DATA "FRED   061111235"
  190 DATA "BILL   051333345(work) 051-6
666(home)"
  200 DATA "BBC Acorn User/Redwood 01490
1444"
  210DATA "|T/phone no.s"
```

Listing 3

```
   10REM DROPKICK merger (Listing 3)
   20REM by Jeff Tullin
   30REM for B/B+/E/M/C with SWR & Bas2
   40REM (c) BAU 1990
   50:
   60 MODE 6
   70 PRINT TAB(9,7)"BBC Acorn User DROP
KICK"
   80 PRINT TAB(13,9)"by Jeff Tullin"
   90 REPEAT
  100 PRINT TAB(7,14)"Name of file to be
 appended?"
  110 PRINT TAB(16,15)".......
"
  120 INPUT TAB(16,15)N$
  130 N$=LEFT$(N$,7)
  140 dummy=OPENIN(N$)
  150 IF dummy=0 PRINT TAB(9,20)"File no
t found (any key)":A=GET:PRINT TAB(9,20)
"                          "
  160 UNTIL dummy
  170 IF EXT#dummy>&3200 PRINT TAB(9,20)
"File too long (any key)":A=GET:PRINT TA
B(9,20)"                          ":GOTO
90
  180 CLOSE#dummy
  190 PRINT TAB(7,14)"   Name of output
file?     "
  200 PRINT TAB(16,15)".......
"
  210 INPUT TAB(16,15)O$
  220 PRINT TAB(16,17)"OK (Y/N)?"
  230 *FX15
  240 REPEAT
  250 A=INSTR("YyNn",GET$)
  260 UNTIL A
  270 IF A>2 PRINT TAB(16,17)"         ":
GOTO 190
  280 *L.header 2800
  290 OSCLI ("L. "+N$+" 3000")
  300 OSCLI ("S. "+O$+" 2800 +4000 D9CD
8000")
```

NOTES



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Z88

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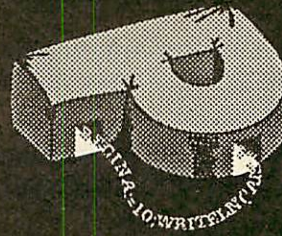
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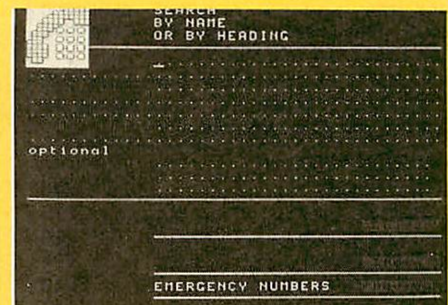
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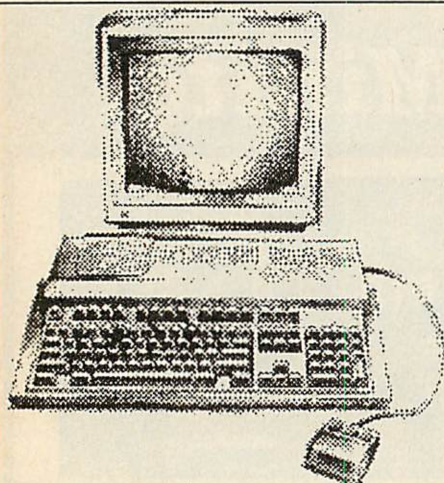


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Sam6 — *Galaforce 2, Hunchback, Hopper, The Sentinel (BBC), Video's Revenge (Electron)*

Sam7 — *Firetrack, Bonecruncher, Snapper, Ghouls*

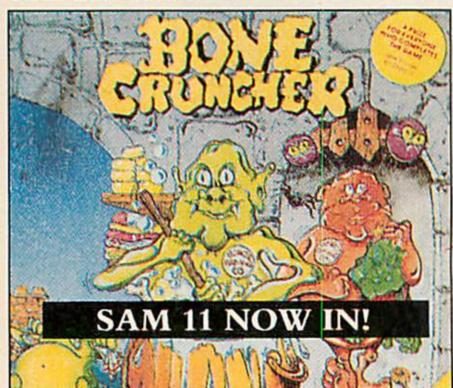
Sam8 — *Winter Olympiad 88, Quest, Around The World In 40 Screens, Mr. Wiz*

Sam9 — *Camelot, Steve Davies Snooker, Spycat, The Life Of Repton*

Sam10 — *Repton Thru Time, 3D Dotty, Zalaga, Qwak*

Sam11 — *Barbarian, Pipeline, Baron, Monsters*

Cassette £9.95, 5.25in Disc £11.95, 3.5in Disc £14.95



CAN YOU BEAT THE SPORTS PROFESSIONALS AT THEIR OWN GAME?
QUESTION OF SPORT

Play TV's most popular sports quiz, for less than half price!

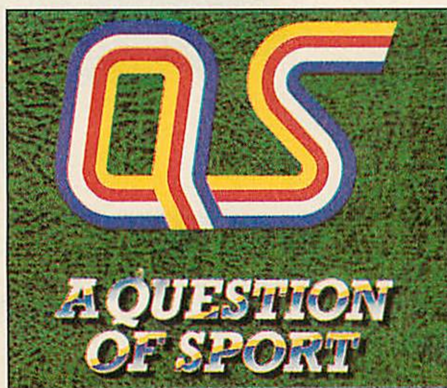
With David Coleman asking the questions and Ian Botham and Bill Beaumont heading up the teams, you can pit your wits against your family and friends, or even challenge your BBC micro.

There are six exciting and fast-moving rounds, including Pictureboard, Mystery Personality and a Quickfire round.

If you've always fancied yourself as a bit of a sports fanatic, this is the program that will thoroughly test your knowledge.

Order your copy today and see if you can beat the professionals at their own game.

	Tape	5.25in	3.5in
RRP	£12.95	£14.95	£19.95
BAU Discount	£6.50	£7.50	£10
Offer Price	**£6.45**	**£7.45**	**£9.95**



ALL THREE TRIVIALPURSUIT AT A TRIVIAL PRICE!

The computer version of *Trivial Pursuit* is faithful to the original board game. The object being to travel around the board answering questions and trying to collect a wedge for each of the six subjects.

The questions are asked by a cute character called TP, while the screen layout shows the board along with the progress of each player.

Don't worry about running out of questions. There are enough in this set to keep you wracking your brains through many sessions.

And for as little as £14.95 we'll send you the complete set of Trivial Pursuit games, including Genus, Baby Boomer and Young Players.

	Cassette	5.25in Disc
RRP	£44.85	£59.85
BAU Discount	£29.90	£39.90
Offer Price	**£14.95**	**£19.95**



Please order using the order form.



ARCHIMEDES

ZARCH

David Braben, author of *Zarch*, is also the co-author of the unanimously acclaimed game *Elite* – probably the world's highest selling computer game.

After months of program development work, David finally harnessed the speed and performance of the Archimedes computer to create another programming masterpiece.

Zarch is unlike any game you have ever seen before. Even the demonstration program, *Lander*, supplied on the Archimedes Welcome disc, can only give the most basic idea of the features and fascination that *Zarch* has in store.

The three-dimensional landscape is realistically portrayed by skilful use of 256 colours, area shading and accurate perspective design. The multi-directional smooth-scrolling movement is also enhanced by the use of twin screens: one is viewed while the other is updated.



RRP £19.95
BAU Discount £5.00
Offer Price £14.95

REPTON 3

The Repton series of games is the most successful software ever published for the BBC micro and Electron computers and has been described as 'The thinking man's arcade game'.

Now, a massive enhanced version is available for the Archimedes, comprising four complete games:

* REPTON 3 * THE LIFE OF REPTON * AROUND THE WORLD IN 40 SCREENS * REPTON THRU TIME

Enhanced features include a choice of four tunes and a position save/recall facility. In addition the software includes a sophisticated Screen Editor and Character Editor with a choice of 16 colours from a total of 4,096 hues. Plus you can design new screens and immediately test them by entering the game section.



RRP £19.95
BAU Discount £5.00
Offer Price £14.95

BBC MICRO / MASTER / ELECTRON

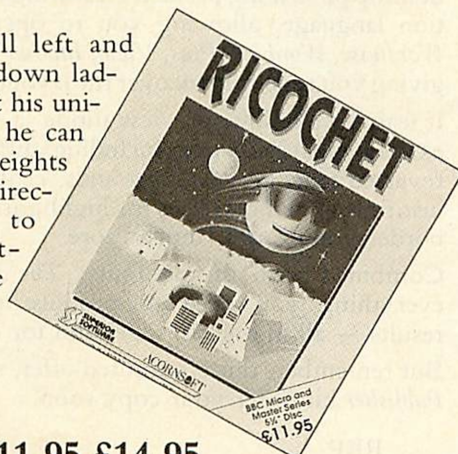
RICOCHET

Ricochet has an amazing 330 different action-packed screens arranged over five levels. You get five games in one, since each level has its own distinctive theme, with superb graphics and unusual puzzles to solve.

You control SPRAT, the Small Partially Robot Alien Time-traveller, in his quest to collect the five hourglasses from the five worlds of *Ricochet*.

SPRAT can roll left and right and up and down ladders and ropes, but his unique ability is that he can jump to different heights and in different directions. You have to control the fast-moving alien as he ricochets through the levels.

Cassette 5.25in Disc 3.5in ADFS Disc



RRP £9.95 £11.95 £14.95
BAU Discount £2.00 £2.50 £3.00
Offer Price £7.95 £9.45 £11.95

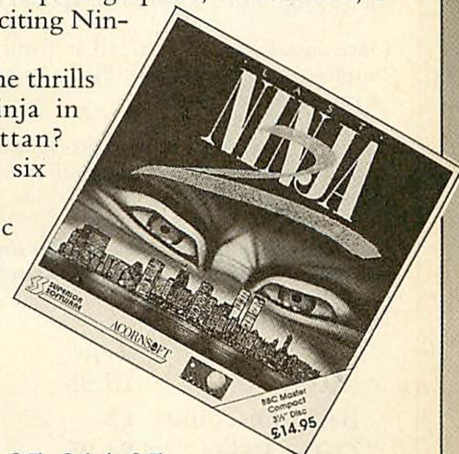
LAST NINJA 2

Born in a time of peace, lived in a time of war, the shadow warrior returns. Leaping the abyss of time he comes to fulfil his destiny!

If you enjoyed *The Last Ninja* you'll go crazy over *Last Ninja 2*. There are lots more fiendish adversaries, more colourful screens with superb graphics, a score line, a timer and lots more exciting Ninja action.

Are you ready for the thrills and skills of the Ninja in crime-filled Manhattan? Can you survive the six action-packed levels?

Cassette 5.25in Disc 3.5in ADFS Disc

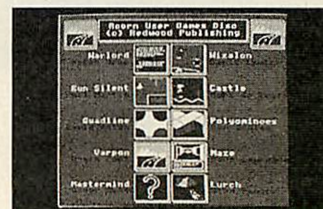


RRP £9.95 £11.95 £14.95
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Offer Price £7.95 £9.45 £11.95

UTILITIES



As a special introduction to the new *BBC Acorn User* Reader Offers section we have put together a sensational 'give away' offer. For just **£24.95** you can have eight of the most popular *BBC Acorn User* compilation discs, worth a total of **£76.60***. That's a massive saving of **£51.65!**



** Please note: This offer is only available on 5.25in format*

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1987 Compilation	£7.95
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Sideways Ram utilities	£10.95
Calligraphy	£10.95
Portfolio	£10.95
TOTAL	**£76.60**

BAU Discount £51.65

OFFER PRICE £24.95

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Speech! is an incredible piece of coding, needing no extra hardware and taking up just a few K of memory, it converts your BBC's sound chip into a full-blown speech synthesiser!

Once installed you can call it from your own programs with simple-to-use commands. Plus you can fully configure it to speak in any accent or pitch.

And you can teach it how to pronounce unusual words and phrases — adding them to the built-in dictionary — customising ***Speech!*** to your own requirements.

Due to a bulk purchase we can offer this unique program to you for less than half price. But place your order soon as they're sure to be in high demand.

	Tape	*5.25in*	*3.5in*
RRP	£9.95	£11.95	£14.95
BAU Discount	£5	£6	£7.50
Offer Price	**£4.95**	**£5.95**	**£7.45**

Please note: ***Speech!*** is not compatible with the Electron

The program is not supplied in its original packaging but is complete and fully working.

THE TOTAL DTP SOLUTION

For a limited period we are offering *The Publisher* PLUS four extra discs giving a total of 86 different fonts for only £49.95!

The Publisher is a remarkably easy to use and powerful desktop publishing package, featuring its own page description language, allowing you to operate it from within *Wordwise, Wordwise Plus, View, Interword* or *Wordpower,* and giving you total control over the layout of your documents.

It features a unique preview mode so that what you see is exactly what you get, including different sizes of font, reversed text, grey backgrounds, centering, left and right justification, 8 box styles for highlighting text and creating borders, and much, much more.

Combined with the 86 fonts, *The Publisher* offers you everything you need to produce professional-looking results — all in one package, and for less than £50!

But remember, this is a limited offer, so to be sure of your *Publisher* kit order your copy soon.

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HARDWARE

Do we have a real scoop for you? . . .
We have secured exclusive rights to offer the last few remaining Tandy FP215 Flatbed Plotters at an incredible saving of £400!

We can do this because, although they are superb pieces of equipment, there are only 80 of them left. This offer is therefore on a strictly first come, first served basis.

If you wish to order yours over the phone, or reserve one prior to ordering by post, please call our mail order hotline on: 0672 40825.

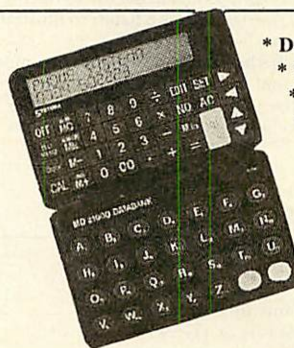
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- ★ Easy connection to most computers
- ★ Comprehensive instruction set
- ★ Simply controlled from Basic
- ★ Full A4 size plotting area
- ★ High quality hard copy for reports
- ★ Will produce transparencies
- ★ Internally processes down to 0.05mm
- ★ Vertical or horizontal printing/plotting
- ★ The ideal companion for CAD programs

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BAU Discount £400

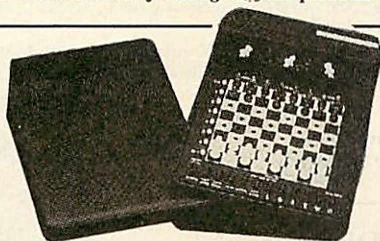
Offer Price £299

Save over 20% on the unique folding Microdiary

Specially designed so that it fits easily in your pocket or wallet, but opens out to give two manageable sets of keys and a two-line display, the 20k Microdiary is the ideal way to keep your important information instantly to hand.
Forget about paper personal organisers, the Microdiary has no trouble holding even the busiest person's contact list, as well as appointments, reminders, memos and much, much more — and you don't need a pen, or have to buy refill packs of paper each year!
And the best news of all is that for a limited period we have reduced the price of this unique device by £10. For just £39.95 you'll have one of the easiest, cheapest and most secure means of managing your personal data.



*** Daily, weekly, monthly and yearly reminder**
*** 21 definable function keys for quick access**
*** Security code to prevent unwanted access**
*** Paperless "printer" for reviewing entries**
*** Address and telephone number storage**
*** Accurate clock * Alarm function**
*** 10 digit display calculator**
*** 24 World time zones**
*** Memo function**
*** 20k memory**
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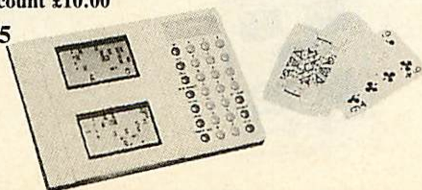


If you can't make up a bridge foursome, try the Dual Screen Bridge Computer

Only slightly larger than a paperback book, yet featuring 28 keys and two displays, the Dual Screen Bridge Computer is the ideal way for you to practice bridge.
Targeted at beginners to intermediate players it will help you improve your skills of bidding, playing and recall. While, if you are an advanced bridge player, the Bridge Computer will help you to keep your hand in.
And for just £49.95, saving £10 off the recommended price, you're sure to find it helps your bridge playing to improve — as well as being a fun pastime you can play anywhere.

*** 4 levels of play**
*** Plays 3 hands**
*** Random cards generated for each hand**
*** You bid against the computer**
*** You can be dummy, declarer or defender**
*** Checks for and disallows illegal play**
*** Displays your cards, the dummy's hand, bidding, playing and vulnerability, and the results of contracts and tricks**
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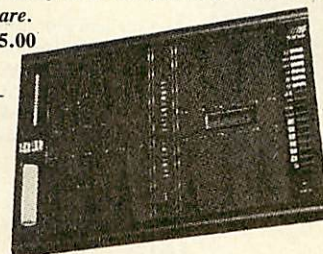
Offer Price £49.95



The go-anywhere Pocket Chess Plus Computer

This is a truly pocket sized chess computer featuring a touch sensitive board so you can forget about entering fiddly coordinates because the Pocket Plus knows where you move each piece.
It comes with a comprehensive coaching facility which teaches tactical manoeuvres, warns you if a piece is in danger and even shows you its thinking.
Programmed with several difficulty levels, whether you are a beginner or a master, the Pocket Plus will give you a challenging game — every time. And it even remembers the state of play when you switch it off.
Normally the Pocket Plus sells for £34.95, but if you buy it from us we'll knock £5 off the recommended price. For just £29.95 you're guaranteed hours of enjoyment — where ever you are.
RRP £34.95 BAU Discount £5.00

Offer Price £29.95



Save £15 on the Saitek Sensory Backgammon Computer

This is a superbly presented portable or table-top backgammon computer which, like the chess computer, has a touch sensitive board so that it knows where you move the pieces.
It features 9 levels of play with a quick response program and a fully automatic random dice display. And if you don't want to play the computer you can use the board to play a friend too.
Recommended at £69.95, we have slashed £15 off the price of this superb product. Order yours today for only £54.95.
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Offer Price £54.95

MASTER COMPACT



Brian Clough's Football Fortunes

Brian Clough's Football Fortunes is a football management game with a big difference. In an exciting departure from earlier simulation games it combines an excellent range of computer based features with a fascinating board game.
Can you compete with human and computer managers to successfully steer your team through the season, using your skill to make it stronger as you proceed?
With the program you get a large playing board, over 100 player cards, stacks of money, some counters and a comprehensive instruction manual. And for only £7.99 you're guaranteed hours of inexpensive yet intense, action-packed excitement!



RRP £9.99
BAU Discount £2.00
Offer Price £7.99

Colossus 4 Bridge



Colossus Bridge allows one player to play a complete game of bridge with the computer controlling the other three hands. Each hand is bid according to the Acol system, while other standard conventions are also available.
If you're a beginner at bridge you can make use of the in-built tutor which has 10 specially chosen hands to illustrate the principles of the game.
In fact, for just £10.99, whether you're a beginner or a more advanced player, you'll find Colossus Bridge is the ideal partner, either for practise or when you can't get another three people together for a game.

RRP £14.99
BAU Discount £4.00
Offer Price £10.99

Tank Attack

Tank Attack is a computerised board game for two, three or four players, where each player takes the role of a General commanding a country's Tank Corps of one or more armoured divisions.
Your objective is to capture the enemy headquarters, which will require the planned strategic deployment of your forces and regular fire duels between your own and enemy units.
Weather, morale, skill, judgement, planning, foresight, careful management of rebuild and repair facilities and luck all play a part in deciding the result of each game.



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Birdie Barrage Golf



An excellent golf simulation offering you the chance to play at the famous Turnberry Ailsa, Belfry Brabazon, Carnoustie Championship and Acorn Park golf courses.
All the features you'd expect form a good golf game are here, including woods, water and bunkers.
And for just £7.99 this must be a game that should be in everyone's collection.

RRP £9.99
BAU Discount £2.00
Offer Price £7.99

Colossus 4 Chess

Probably the most complete chess program available for any home computer and written using the very latest techniques, by a computer chess programmer with over eight years experience.
Colossus perfectly understands the rules of chess and can handle all standard mates, while offering you the choice between a two- dimensional flat board or a stunning 3D display.
It comes with a comprehensive instruction manual and must be the best chess program for casual and serious players alike.

RRP £14.99
BAU Discount £4.00
Offer Price £10.99



Steve Davis Snooker

This has to be the best snooker simulation you can buy, which is surely proven by the fact that Steve Davis has endorsed it!
It includes a computer play option, infinitely variable speed, spin, friction factor, break score and a foul shot facility, as well as superb graphics.
If you fancy yourself as a good snooker player, for only £9.99 why not see just how good you are at the computer version.



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Sporting Triangles

No matter what your sporting preferences may be, Sporting Triangles is bound to intrigue, puzzle and frustrate you.
It includes over 2,500 questions to choose from, across 12 action- packed sports.
All the features of the top rating TV quiz show are combined in this superbly presented and equally compelling game.



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Football Director

Billed as the ultimate football challenge, Football Director features four leagues with 20 teams each, a 38 game season, home and away matches, FA and League Cups, replays and much, much more.
In fact it's so packed with features it really is almost like the real thing, including player's morale, substitutions, injuries, transfers, promotion and relegation, tax, interest, wages and many more than there are room to print here. At the virtually give-away price of just £9.99 Football Director will give you hours, if not days or weeks, of action-packed excitement.

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BAU Discount £3.00
Offer Price £9.99



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* Nightmare Maze
* Darts
* Diamond Mine
* Screwball



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* Bar Billiards



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But, more than that, we regularly ask our subscribers for their views on the magazine, have subscriber-only competitions and are planning some subscriber-only extra-special offers in the near future.

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So why not subscribe today? Remember, you'll get a lot more than the next 12 issue of *BAU*.



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The Small Print

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2. This offer replaces all previous subscription offers as stocks of free gifts from previous offers are no longer available.
3. Please remember that your free gift will be despatched separately from the first issue of the magazine to which you subscribed or renewed.





DISCS



PLEASE SEE THIS MONTH'S YELLOW PAGES FOR FULL DETAILS

What's on this month's disc

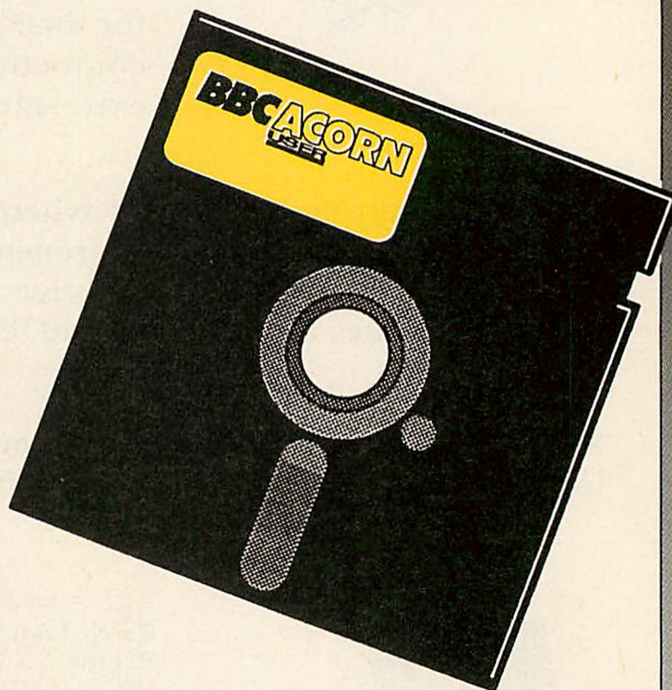
You know that *BBC Acorn User*'s yellow pages consistently bring you the best in new software for your BBC or Archimedes each month.

But why not save the wear and tear on your fingers, and get programs that work the first time by ordering this month's disc.

As usual it's packed with plenty of software for everyone.

5.25in disc £6.95
3.5in disc £7.95

BLANK DISCS



You know how quickly you can go through floppy discs, so here's a special offer that will keep you stocked up for a good while – and save you money.

For this month's special we are offering either 50 5.25in or 25 3.5in *BBC Acorn User* branded floppy discs, including sleeves and blank labels with the *BBC Acorn User* logo, for only £19.95.

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Language Translator	☐	(?-027) £29.95

SUBSCRIPTIONS

with FREE game (UK only)

	Tape	BBC 5.25in disc	BBC 3.5in disc	Archimedes
Ricochet	☐	☐	☐	–
Last Ninja 2	☐	☐	☐	–
Zarch	–	–	–	☐
Repton 3	–	–	–	☐

Please tick the game you require

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MASTER COMPACT

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Buy six Sams and tick the other FOUR FREE!

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CHEAP AND CHEERFUL

You don't have to shell out a fortune for useful well-written software. **GRAHAM BELL** explores the world of public domain software, shareware and careware

Writing eight-bit Beeb software was for several years typified as a 'cottage industry': there was a large group of one-man (or woman), part-time software houses, often selling just the single product that person had written. The world was small and simple enough for this to be a successful strategy.

The Archimedes market isn't at all like that. So far, it's dominated by a coterie of big companies and blockbuster applications – *Pipedream*, *Multistore*, *Impression*, *Artisan* and the rest – and writing 32-bit multi-tasking software is so complex that only companies with huge resources can master it...

Wrong! The Arc market is teeming with tiny programs that are often cheap, useful and easily available once you know where to look. They range from the downright silly through to arguably vital utilities like *ChangeFSI*. The multi-tasking nature of Risc OS boosts the value of many utilities, as the smaller items of software can usually interact with 'core' applications – and the whole is greater than the sum of the parts.

Perhaps the least obvious items of 'free' software are those core applications and utilities on the Risc OS welcome discs: *!Edit*, *!Paint*, and in particular *!Draw* are extremely capable programs that must form the heart of every Archimedes system. While everyone with an Arc has these three applications to hand, other pieces of free and cheap software are sometimes less easy to find. But there are a number of established sources for free and cheap software, and often several of these sources offer substantially similar programs.

So what's on offer? There's a vast number of cheap and free programs and applications available, so what follows is not a comprehensive list. Nor has *BBC Acorn User* been able to test all the software fully. But we'll look at what's on offer in several (rather blurry) categories: glue programs and desktop accessories this month, complete applications and programs that can best be described as 'decorative' next.

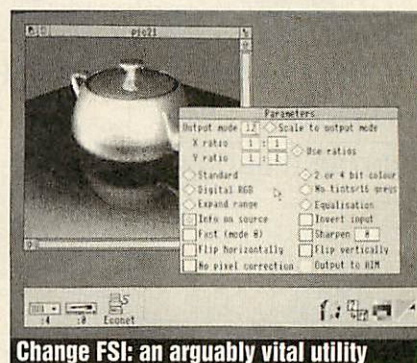
Glue

One of the penalties of choosing a computer with an innovative operating system, like the Archimedes, is the relative difficulty of linking it to other micros to share data. If you buy an IBM PC clone, then you can be fairly sure that the floppy discs will be interchangeable with other PCs. Even modern Apple Macintoshes have ditched their former isolationist stance – they can read IBM PC discs.

The Arc has a single 3.5in floppy disc drive, and the built-in Advanced Disc Filing System is compatible with ADFS discs from older Acorn machines like the Master Compact, Master 128 and even the Electron. There's an obvious need for a direct way of reading DFS discs from BBC model Bs or Masters.

These are the machines from which Arc owners have most often upgraded. And there has to be a way of reading data off the IBM PC discs that form a 'common denominator' between business micros (without using the PC Emulator). *DFSread* and *PCdir* are the two vital utilities. *PCdir* by Keith Sloan is careware (see box), and it can read MS Dos or even Atari ST discs.

There are several DFS readers around, public domain, shareware or commercial, including a DFS to ADFS convertor, and CJE Micros' *DFSreader*. The DFS readers allow you either to read files from DFS to ADFS (in which case you generally need two floppy disc drives) or to Ram disc (from where you can later save the file to ADFS in the usual way). What they don't do is


Change FSI: an arguably vital utility

allow you to use DFS discs on the desktop or drag files directly out of DFS filer windows.

This desktop approach is taken by *PCdir*, and by Dabs Press' more expensive *DFSreader*. These add a new disc drive icon to the desktop – clicking the mouse on this opens a window showing the files on the disc, and you can drag them to an ADFS filer window or directly into an application. So to read a PC text file into *!Edit*, all you do is drag its file icon from *PCdir* across the screen. This is even better than the access Macs give to IBM discs.

There is still a physical problem with either DFS or IBM discs of course – they are most often 5.25in – so you need an external drive adaptor for the Arc and a spare 5.25in disc drive, or a Beeb or a PC with a 3.5in drive.

Once you've moved software from PC or Beeb to the Arc, if won't of course work (though the Arc's emulators may help). But datafiles – text, graphics, and so on – may be used. There's a group of utilities that make this easier.

ChangeFSI is free, and great for converting 'foreign' picture files to Arc sprite format. It can accept files from PCs with a variety of formats including TIFF (tagged image format files), IFF (image format files used by Electronic Arts, painting software), GEM .img files and .pic files.

It can also be used to convert Arc sprites from 256 to 16 colours or from 16 greys to black and white (useful if you have a scanner), in order to reduce the file size without

compromising too much on quality. And finally, it can convert Watford video digitiser files, *Proartisan* pictures and *Timestep* satellite images into normal sprites (all normally have their own file types).

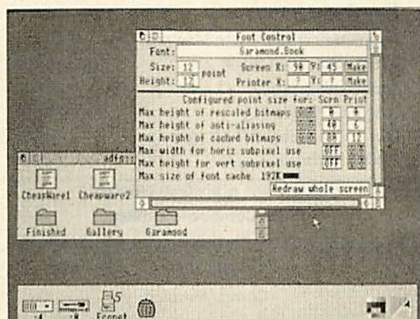
ChangeFSI's missing link is Beeb screens – a mode 0 screen saved from a Beeb isn't the same as a mode 0 Arc sprite. *BBC Acorn User*'s own *BeebModes* module from Arc Agora allows old model B or Master screens to be loaded with a simple star command, and then a *ScreenSave will save them as an Arc sprite.

Reading other data, such as wordprocessor text, is more problematic. Software Solutions sells utilities to convert old *View* and *Wordwise* files into *First Word Plus* or *!Edit* format. There are several similar utilities on Norwich Careware discs 4 and 6. Text data not covered by these utilities is best loaded into *!Edit* and edited to remove the control codes.

As well as reading discs, you can transfer data over a serial lead. APDL public domain disc 26 contains utilities to ease file transfer to the Psion Organiser, the Z88 and Beeb. For civil service types, disc A25 enables serial connection to a Thorn EMI Liberator (a portable computer). Once you've imported your data, you may need to set a file type – usually to label the file as text. All the sources of public domain software list at least one version of *Settype* to do just this.

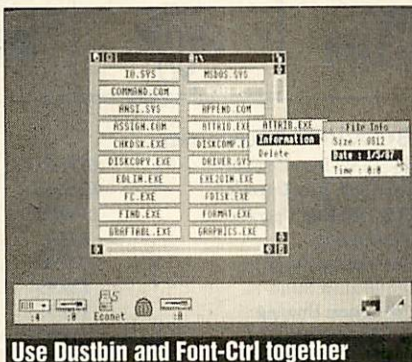
Accessories

Settype is a simple utility because it merely adds a desktop veneer to an existing star command. It's one of a number of utilities



PCdir can read MS-Dos or Atari ST discs

to do this. Bin (also known as Dustbin, Trash and so on) adds a dustbin icon to the icon bar to replace the *DELETE command – and dropping a file onto the bin 'deletes' it from the disc. But like the Mac's wastebin, it can be emptied: you can rummage through your 'deleted' files and drag them back to an ADFS window if you decide you've made a mistake. The bin bulges to show it's holding your rubbish, and only really gets cleared out when you quit or leave the desktop. It works best with hard discs, as otherwise *Bin* prompts you to insert the *Bin* disc every time you delete a file. In dubi-



Use Dustbin and Font-Ctrl together

ous taste, there's a version of *Bin* fashioned to look like a toilet (which can be flushed).

If you program in Basic using the *ARM Basic Editor*, then Norwich offers another convenience (settle down at the back, please) – *BasicEd* – which displays a *Basic Editor* icon onto which you can drag Basic program files. And *FontCtrl* offers an easier way to set up the Arc's outline font manager than by using *Configure commands. It displays a dialogue box on screen, and allows you to change the FontMax parameters and test the effects at will.

Finally for this month, there's *StickBd*. There are several versions of this utility, from both Norwich and APDL, but essentially they are all the same. It makes the grey desktop background 'sticky', so you can park files you use regularly there. You can save the state of the desktop so the files can be stuck there when you switch on tomorrow. Having them stuck to the desktop background means you don't need to wade through several levels of directories to get that file you use every day. For hard disc users, in particular, it's a boon. The most comprehensive version (from Sandie the Walrus) allows you to display any sprite instead of the grey desktop background.

Next month, Graham Bell rounds up a few complete applications that you can bag almost 'for free'.

COPYRIGHT

It's important to differentiate between several terms used to describe cheap and free software – terms like 'PD' and 'shareware' are bandied about freely, but copyright ('intellectual property right') is a complex area.

First, it's important to remember that copyright is automatic. An author doesn't have to 'register' work to make it his or her property: just writing it is enough.

If a program is placed in the public domain by its author, this usually takes the form of a notice in the program itself saying the author relinquishes any claims to royalty payments. It means the software can be distributed free by anyone, but it doesn't give others the right to use chunks of that program in their own commercial products.

Shareware is an American term describing software that can be freely distributed, but on which royalties are still payable. The idea is if you don't like the software, dump it. But if you find it useful, then some royalty 'donation' should be made, and this often entitles you to upgrades or perhaps a manual.

In practice, British shareware is often distributed for a small fee, and the distributors pay software authors a tiny royalty. A newer concept is 'Careware', where a small donation to charity is made when you purchase a disc.

Breaking the terms of distribution set by the program's author is breach of copyright – so never simply assume a program is public domain or shareware. Check first. Music is one area where confusion is rife. Tunes are, in general, not free. Check that the distributor knows who the composer or copyright holder is, and that the correct fees are being paid directly or through the Mechanical Copyright Protection Society.

Products

PCdir; Norwich careware disc 4; £7
DFStoADFS; Norwich shareware disc 20; £3.50
DFSread, DFSwrite; APDL public domain disc A10; £2.50
DFSreader; CJE Micros; £12
DFSreader; Dabs Press; £30
ChangeFSI; Robert Hamilton; Send blank disc and postage
Beebmodes; *BAU* August '89 monthly disc; £7.95
View-1WP etc; Norwich careware disc 6; £7
Psion Z88 and *Liberator*; APDL discs A25, A26; £2.50
Settype; Norwich shareware disc 23; £3.50
Bin; APDL disc A10; £2.50
Trash; Norwich shareware disc 20; £3.50
BasicEd; Norwich careware disc 3; £7
Fontctrl; SID; free
Best StickyBd; S Walrus; approx £2.50

Suppliers

APDL, 96 Lanehouse Road, Thornaby, Cleveland TS17 8EA
Norwich Computer Services, 18 Mile End Road, Norwich NR4 7QY
Robert Hamilton, The Forge, High Street, Loftus, Saltburn, Cleveland. MS13 4HW
SID, Acorn's Support Information Database, available on Micronet or direct (0223 243642 – set your modem as for Prestel)
Arcs PD, 279B Romford Road, Forest Gate, London E7 9H3
Sandie the Walrus, 12 Mornington Road, Radlett, Herts WD7 7BL

CRYSTAL GROWTH

Qume's super-cheap Crystalprint WP laser printer has been upgraded but, much to the delight of **MALCOLM BROWN**, the price stays the same

When the Crystalprint WP was reviewed in *BBC Acorn User* in the February 1989 issue, it seemed that laser printers could get no cheaper, no better value for money.

But Qume has upgraded the 'cheapest laser printer available', the Crystalprint WP, to the WP+ and managed to keep the price the same, at £945.

For all its cheapness, the old WP was the bare minimum a laser printer could be. It had just 128K of Ram and was compatible with Diablo control codes only.

Emulating a daisywheel printer, it could print just text – in two fonts with no effects such as italics – and no graphics. The Crystalprint WP was too inflexible to be seriously recommended as anything other than a limited replacement for daisywheel machines.

However, the upgraded Crystalprint WP+ is a whole new kettle of fish. Now there is 256K Ram and full Hewlett-Packard LaserJet emulation – something you won't find on any other laser printer with a list price less than £500 more than the WP+.

The Crystalprint WP+ is not, strictly speaking, a laser printer at all. Like the rest of the Crystalprint range, it contains no laser but uses a halogen lamp shone through a liquid crystal shutter (a little like the LCD display in watches and laptop portables) instead of a mechanically scanned laser beam. This (in theory, at least) makes the WP+ less fragile than conventional laser printers.

However, the Crystalprint WP+ performs just like (and as well as) any other laser printer, much better than many in fact. It produces the same 300x300 dots per inch as other machines giving text which is difficult to tell from typeset or typewritten and crisp graphics with particularly even black areas.

It is not one of the fastest machines around but it's quite adequate in this respect. It is, however, one of the most compact.

The 100-sheet in-tray is slotted into the base of the machine and the out-tray on the top so there are no bits sticking out of the sides with this model. This arrangement



does mean, however, that the WP+ cannot handle envelopes.

Since the WP+ is fully HP LaserJet-compatible, it can perform a few more tricks than the Diablo-compatible WP. But there's only one font on the new machine – the standard Courier typewriter look-alike. What's more, in the Acorn world, downloadable fonts just don't exist. There are extra fonts available on cartridge but only at about £90 each.

Of course LaserJet printers can produce wonderful graphics. Don't go away with the idea, though, that this machine can be combined with an Archimedes for DTP work, or indeed anything much in the way of graphics.

Since it only has 256K of Ram, it cannot store the memory mapped dot data for an entire page in memory. For that it needs about 1Mb.

If you try to print a page with an Arc using the LaserJet printer driver or dump a screen from a Beeb with, say, the HP dump from the November 1988 *Acorn User*, it won't work. The WP can only hold a quarter of the page at a time and when the memory's full it prints just that quarter page.

With scissors and a bit of glue, a whole page can be created but it's hardly the same thing.

Nevertheless, the WP+ is simple to use, easy to set up and easy to maintain through the inevitable paper jams and toner changes. The Crystalprint WP+ is the cheapest way by far to enter the world of laser printing.

For Beeb or Arc users it doesn't offer much more than the old WP. But this machine, like its predecessor, can be used as a modern and convenient alternative to a daisywheel printer for neat and fast printing. For small pictures (less than a quarter page!) it can even be used for graphics.

It must be said that for a cheap but serviceable laser printer the best bet is often an end-of-line model.

Many are offered all the time at knockdown prices. Such past glories as the Epson GQ3500 can still be found gathering dust in the back corner of local dealers for £1100.

But perhaps the most impressive feature of the Crystalprint WP+ is that Qume will upgrade the printer after sale to either of the more advanced models, the Series II 512K HP LaserJet compatible printer or the Publisher Postscript machine, for just the price difference.

So for any first-time user, buying a WP+ is not only a cheap way in but it could be the start of something big.

The Cystalprint WP+ *costs £945 from Qume, Qume House, Parkway, Newbury RG13 1EE. Tel: (0635) 523200.*

TOP DRAWER

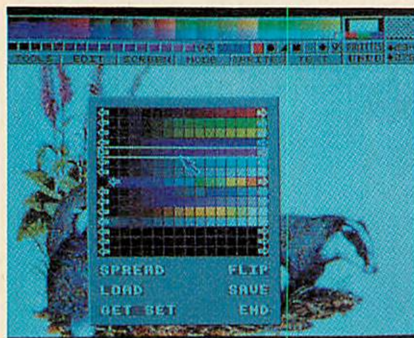
ROB MILLER looks at Arcol, the latest in high-powered Arc graphics software, and finds himself indulging in an orgy of sprite-scaling and pixel-zooming

The Archimedes graphics market is already quite full, so a new art package has to be something that will stand out from the pack. *Arcol*, a 'multi-user art package' from Tap Consortium does.

Based around a mode 13 screen (320 x 256 pixels with 256 colours), *Arcol* allows users to share resources such as printers and storage across a standard Econet network. Designed primarily for educational use, there are a number of features within *Arcol* which have been included to fit in with current National Curriculum standards.

The first thing that strikes you when loading the package is the total absence of Risc OS 'conformity'. The package does load from the desktop but moves straight to a full mode 13 screen, complete with menu bar along the top.

Two screens are actually usable at the same time and can be toggled to either one or the other. The second screen can be used for rough work or as an extension to the first screen. The two screens do in fact join together and can be scrolled smoothly to any position using Page Up and Page Down.



Digression from the standard may be seen as a drawback, especially as people will be more used to the desktop, although in practice, it has little effect on the overall use of the program. It does in fact have several advantages, especially when the program requires the processor's time for complex manipulation.

Once loaded, the full palette, plus a selection of menu headings, appears along the top of the screen. Any of the program's features can be accessed from here, making the package easy and fast to use. Most of the features can also be accessed by means of the keyboard. Pressing 'z' for example, will instigate the zoom/pixel editor.

The first heading 'Tools' contains all the usual drawing shapes you would expect, including sketch, lines and fills. All of the tools can be used in conjunction with a separate Mode menu, which alters the way in which colours and so forth are applied to the screen (more of this later).

The drawing tools are all designed to use one of a selection of brushes, always present on the main menu. This means that lines of any thickness can be drawn easily. Brushes that are not included can be designed by using the outline of a pre-cut sprite.

A sub-menu called Shapes allows either filled or outlined rectangles, triangles, circles or ellipses to be drawn at any size on the screen.

Spline curves can be also be selected and edited easily by dragging the corners, before fixing them permanently in place. It's worth mentioning at this point that an Undo option is always accessible and will undo the most recent operation, no matter what it was. Also holding down the left-hand mouse button with any operation will rub it out.

An Edit menu encompasses all things to do with editing what is already on screen. The first item, Zoom, is perhaps one the best features of *Arcol* . At last someone has actually written a painting package that allows you to use all tools within the zoom window. A grid can be toggled on/off to simplify editing of large areas. Also, the fact that you can zoom in at anything from 2x to 20x pixels (extremely fast), makes it the best I've seen out of all the current Arc offerings.

A pattern editor allows patterns based on a 4x8 matrix to be defined using any of the available colours. A number of sample patterns are included on the *Arcol* disc, including the usual bricks, basket-weave and chequering. Patterns can also be defined by copying areas directly from the screen.



As well as the zoom window grid, an overall screen grid allows the step between co-ordinates to be altered in both x and y axes. Grids are defined by dragging a mini-grid out to the desired size. A numeric display of the pixel size allows accurate calibration.

The Clear option simply clears the screen to the current background colour shown on the screen border. I think maybe that clearing the screen could be regarded as quite a drastic 'edit' and should have been situated in the Screen menu.



An Undo option mirrors the effect of the Undo icon on the main menu. This can be set to undo everything from a particular point in a picture, or the most recent action.

Perspective drawing can be made easier by using the feature which allows a reference point to be set from which all subsequent drawing actions will originate.

The screen menu mainly consists of whole-screen operations such as loading/saving and printing. The print option uses its own printer drivers to dump in a number of ways. Both Integrex 132 (colour) and black and white Epson compatibles are supported.

Both printers can dump screens at A5, A3 (which is printed as two sections that need to be physically joined together) or as a set of colour separations which can then go on to be used for commercial offset printing. The poster option works particularly well on an Integrex and should be popular among children (or adults) who want to display their masterpieces. Printers with parallel and serial ports are catered for as well.

Colour selection from the screen is included in the screen menu, which can be awkward at times when you want to pick the colour you've just passed over. It does

have its own single key-press command, although instant access, using, say, the middle mouse button would have been nicer.

As well as the main 256 colour palette, it is possible to call up and re-edit a set of 16 sub-palettes. The default set includes the scales of the primary colours, plus a number of mixed ones including 'spectrums' (ie. ROYGBIV) and 'heat-like' (red through orange and yellow to white).

The other option allows any one of three types of input device to be selected (as long as you have them in the first place).

Mouse is the default and the other two are the Graphtec and Genius graphics tablets. Wiring diagrams for both devices are printed in the *Arcol* manual to facilitate making up connecting cables.

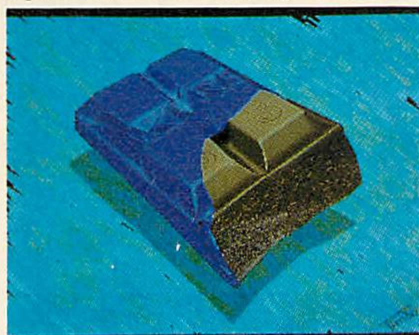
The Mode menu is yet another powerful feature in *Arcol* . Each option in the menu controls the way in which colour is applied to a picture, some of which can be combined to give some clever effects.

The options can be divided into two sections; those that produce a completely different colour and those that change the colour already on screen.

The first four options concern Solid, OR, AND and Invert; similar in fact to the first four options of the Basic GCOL command. Cycle manoeuvres singularly through the shades in the currently selected sub-palette. Cycling normally occurs continuously, even when nothing's being drawn.

A Step option can be set to make the sub-palette cycle one step each time a mouse button is pressed and released.

Recolour works in a similar way to *Artisan*'s famous 'Magic Brush'. Two banks of colours can be set up, one of which will replace the other when any subsequent



drawing takes place. A good use is when you wish to lighten/darken an area of the screen to a pre-defined set of shades.

There is a shading option although it calculates its own next, logical, darker or lighter colours.

Shading is particularly useful when doing anti-aliasing (blurring of 'sharp edges') by hand, or for producing drop shadows for pre-cut sprites.

Anneal seems to be just a pretty effect. It is similar in use to the cycle option although the complete 256 colour palette is used.



Some quite psychedelic effects can be achieved by using a large brush and the anneal option. Digitised black and white pictures make good screens to try the anneal effect on.

The Smear option breaks up the picture where the brush passes, while Wash blurs adjacent colours together giving a kind of soft-focus look.

I would have perhaps called the Smear option 'Shatter' as this describes its effect more suitably. Finally, Blend makes the brush semi-transparent and allows effects such as coloured glass possible.

Subsequent use of the same brush over an area can increase or reduce the amount of transparency.

The Sprite menu is what I think really makes *Arcol* stand out. There's no need for any sprite editor as the second screen can be used instead in conjunction with the Zoom option.

Sprites can be produced by banding around the desired area with any number of joined lines, or by enclosing them in a draggable rectangle

Both methods automatically produce a mask which is defined by the current background colour. An omission is the inability to have more than one mask colour. Let's hope it appears in future releases.

Actual sprite manipulation is remarkable to watch. Apart from the usual x and y flipping, there is Re-size, Re-shape and Rotate/scale, all of which take place at amazing speed.

Re-shape actually allows a whole-screen sprite to be stretched and squeezed into any four-sided shape, all in real-time. Considering the amount of maths needed, this is quite remarkable even for a micro like the Archimedes. Rotate/scale also works 'as you watch'.

A Ball-sprite option is included and this allows you to squeeze any sprite into any sized sphere. This can be achieved by using the separate Sprite fill option so it appears strange that it was included.

The final two options allow sprites to be used to form lines, for borders and the like. If you wanted to have a (wiggly) line of arrows, you need only draw one, cut it out as a sprite and then use Sprite line.

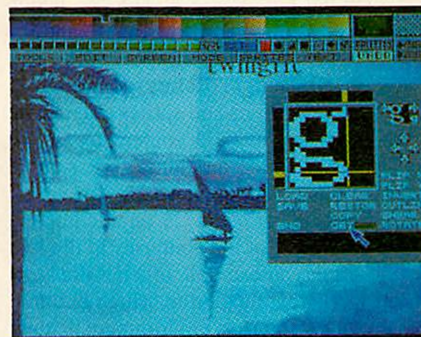
The arrows will be rotated to follow the direction of the mouse pointer. No art package would be complete without a text handling facility and *Arcol* scores very well in this area.

Twelve fonts are supplied as standard and an editor is also included for you to design your own. All fonts are bit-mapped and are of fixed size.

They can of course be cut and rescaled although this introduces a rather more pixellated look into the text. Anti-aliasing (washing) can be used to some extent to overcome this.

The font editor is simple to use and allows microspacing between individual letters. That is, a letter 'i' can be made to take up less width than a 'w', making words more 'visually pleasing'. New fonts can be saved to disc for later use.

It would have been nice to be able to have used outline fonts, like those used in *!Draw*, although this might have been



beyond the scope of an educational program. The existing fonts do suffice and some interesting effects can be achieved with time and patience.

Arcol certainly appears to fulfill its role as an educational painting package and students should learn a lot from experimenting with combining textures and patterns.

The different effects made possible by using combinations of tool and effect seem limitless and it will take someone a long time to fully appreciate *Arcol* .

From a professional viewpoint, there are one or two features lacking such as the text, although in the current market, *Arcol* still outperforms the competition in a number of aforementioned areas. Perhaps Tap Consortium could expand on the current program with a professional version working in mode 15.

Arcol is good value, so check it out now if you're serious about art.

Arcol *costs £50 + VAT for a single-user version. The multi-user site licence version costs £250 + VAT. Both versions are available from ExpLAN, 34 Drake Gardens, Tavistock, Devon. Tel: (0822) 613868. The single-user version only can be obtained from Technomatic Ltd, 468 Church Lane, London NW9 8TQ. Tel: 071-205 0190.*

NEW GENERATION

Genesis is an ambitious name for a software package. But **DAVE FUTCHER** finds that this program really does let you create new worlds – of data

Genesis, from Software Solutions of Cambridge, offers a powerful information environment for the Archimedes and BBC A3000 series. It allows you to create, retrieve and customise many different forms of information on your computer just as you would in your mind – by association.

You can use it to look for and store words, charts, pictures, digitised photographs and even music – on any subject that suits you. Any one piece of information stored in *Genesis* can be connected to any other.

Genesis is supplied on two discs. One contains the application editor and the other example applications.

The application editor disc contains *!Genesis* which is used for editing and altering *Genesis* applications, *!Browser* which allows existing applications to be assessed but not altered, *!GenFiler*, which is used for displaying the resources and the pages associated with an application, and *!GenLib* which is a library of resources containing drawings and sprites that can be used in any applications you create.

The second disc contains five sample applications – *!AboutGen* tells you about *Genesis* itself. *!Europe* is an incomplete file about many of the countries in the EC. *!MyVillage* is an example of a possible primary school application in which children have written about an environmental study of a village. *!Chemistry* covers the Periodic Table giving information on various elements, while *!Phone* is an application to send pulse dialling tones for new types of telephone exchanges.

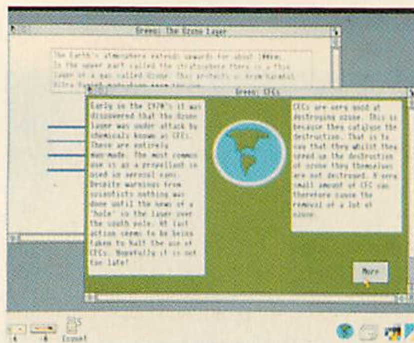
The package is not copy protected and can easily be backed up to floppy or hard disc. It's immediately runnable with the Acorn System files provided.

Pages of information

Genesis provides the framework for creating pages of information which can be linked together to form an application.

Firstly a blank application has to be created. With the pointer positioned on *!Genesis* on the icon bar you click the centre mouse button and the *Genesis* editor menu pops up. From this, New Option is selected, which brings up a window representing the new application you are going to make.

Pages are the fundamental building blocks of a *Genesis* application. But the contents of a page can be thought of as being in three layers. At the back is the background, which can be any single available colour. In front of this can be a backdrop, which can be a drawing, a sprite, or a digitised picture which is drawn to fit the whole page. Finally, in front, are a number of frames with data attached to them.



So above the background and backdrop a typical page can contain several rectangular areas called frames. Each of these frames can have information attached to it.

Data types

The most commonly used type of data is text, and using *Genesis* this is merely a question of typing it in, after you have clicked the inside of the frame to position the cursor in the frame you are creating. You also have control of the text's style, size, height, text colour and background.

Pictures are sometimes worth 1000 words and *Genesis* handles them with ease. To attach a drawing to a frame you simply drag the appropriate Draw file icon and drop it on top of the frame. The contents of the Draw file are then scaled to fit within the frame.

Unfortunately, within *Genesis* there are no editing options available and you have to return to *!Draw* or a similar application to make the changes you want, and then replace the old version of the file attached to the frame with the new edited one. Of course the drawings you use can come in many shapes and guises. They can consist of pure line drawings or solid shaded pictures. They can also contain a mixture of text and graphics such as graphs produced with the *Presenter 2* package where the axes are labelled or the key for the colours is given.

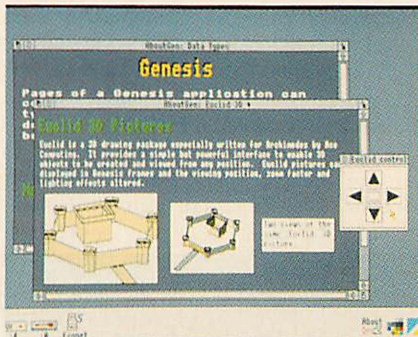
A *Genesis* frame can also handle another form of graphical object – sprites. These are produced by a painting program such as *!Paint*, *Atelier* from Minerva or *Proartisan* from Clares. It is also possible to use digitised pictures which have been stored as sprites.

When a picture created with an application like *!Paint* is made up of a series of sprites, *Genesis* will only use the first and ignore the rest. This is easily overcome by saving sprites as individual files.

Genesis can also handle music files created with the *!Maestro* music editor which is also supplied by Acorn on Application Disc 1. Just like Draw and Paint files, Maestro files, can be dragged and dropped on the top of frames.

Music files can certainly make *Genesis* pages more interesting. A good example is the *!Europe* application where a number of the countries' national anthems are included in the pages.

This feature would have particular relevance if a specific music database was being developed. For example, a database of composers need not be limited to details



about their life and work – it could include short musical pieces to demonstrate the type of music they wrote. Similarly a database about musical instruments could include examples of the sounds each produces.

It is also possible to load files created with Ace Computing's *Euclid 2* package which allows three-dimensional pictures to be placed in *Genesis* frames. *Euclid* pictures are attached to *Genesis* in the usual way although a *Euclid* 3D frame contains two pictures, both with the same 3D image attached but viewed from different angles.

The package can also use films created with another Ace Computing package called *Mogul*, which allows 3D objects to be animated. Frames using *Mogul* files are probably the most outstanding feature of any set of pages created with *Genesis* although they can use up a large amount of memory and disc space.

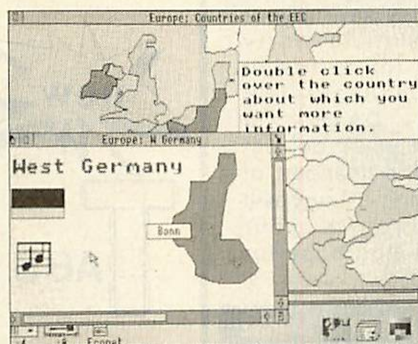
Moving around

Movement from one page to another is central to this kind of information environment. You merely double-click an on-screen button and you are linked. For instance, in the *!Europe* application, you are shown a whole screen map of Europe and, on clicking within any one of the countries' boundaries, you are taken to a series of frames about that country.

Setting up such page-to-page links is simple enough, as the Frame Menu has a Link To option which calls up the Link Tool. It is then just a question of dragging this tool and dropping it on the target page to create the link.

As well as the sample applications, *Genesis* has a collection of resources to help in the creation of your own applications. These are held in the !GenLib directory of the *Genesis* Editor disc.

In the Buttons directory a set of buttons is provided to use within any application



being created. Some of these are just icons with no predefined action but some have specific functions.

The HOME button is used to take the user back to the title page and NEXT takes you to the next page numerically in the current application. There are also draw files, sprites, music files, and *Euclid* files. I was surprised at how few files of this type are provided and I think the package would have benefitted from a larger library.

Creating a database

Genesis could be used to create a database, firstly by defining a page that contains fields normally associated with a database record and then by making copies of it.

As well as the normal type of textual information that lies at the heart of databases, the package allows pictures and drawings to be included very easily.

Because *Genesis* allows linking between pages, a relational database can be created simply. Each record page can link to the next page and to one or more records in other databases. This results in a completely cross-referenced set of pages which can be searched quickly in many different ways.

It's quite hard to find things *Genesis* can't help with, particularly because a file of any data type can be held within a page, and when activated, will be passed to the appropriate application. So it makes a great front-end for other Risc OS applications.

On a simpler level *Genesis* is brilliant for creating adventure games, and it could make a first-class presentation system.

In fact, it offers far more than normal presentation systems because, if the audience requires more information on a particular topic, the presenter can use *Genesis* to display additional information before returning to the main topic.

It's possible to use *Genesis* for desktop publishing too. When used in schools it could be more appropriate than actual DTP packages in some situations.

Conclusion

This package gives anyone, in business, research, education, or at home, the ability to organise pages of information in a unique way. Once a 'database' is created anyone can explore a very large amount of information simply and quickly – it certainly puts information at your fingertips.

In presentation graphics, it could be an ideal way of presenting, for example, an architect's report. Rough three-dimensional models of structures could be appended to the database, along with blueprints, to make concepts truly comprehensible. The same goes for more staid businesses, where histograms and pie charts are needed. It is also an ideal educational tool in any area.

Genesis is a versatile tool. On one hand it offers immense power and potential for information handling.

On the other, it offers a genuinely user-friendly environment in which those who at first lack confidence with information technology can very easily gain it.

Genesis *is available for the Archimedes series and the BBC A3000. It is published by Software Solutions, Broadway House, 149-151 St Neots Road, Hardwick, Cambridge, CB3 7QJ. Cost £86.95 (educational price £69.95).*

MIXING MEDIA

Genesis is the first Arc 'hypertext' package. The hypertext concept was pioneered on the Apple Macintosh, with the introduction of Hypercard. This represented a unique approach to the presentation of information when it arrived.

Hypercard-type systems are distinguished by two important innovations. First of all, with the possible exception of games, almost all existing applications present information in one form only. Wordprocessors produce text, drawing programs produce graphics and so on. Although some areas, like desktop publishing, mix these media to some extent, the aim in such applications is not so much to use the computer as a presentation tool, but to end up with something on output in a non-electronic form, such as paper.

Hypertext applications, by contrast, actively use the micro as a presentation tool. The virtue of micros has always been that they are interactive, extending the freedom of users to choose the information pertinent to them.

Using a range of different media extends that choice even further – here users can choose not only the data, but the form in which it is presented.

Secondly, systems like *Genesis* are exemplified by the way in which they allows the originator of 'applications' to set up a rich structure of linkages between individual data items. Even though these might be all simple text, this idea gets away from the linearity of our traditional approach to information.

Advocates of hypertext, such as MIT's Media Lab, envisage a future where electronically produced 'hypernewspapers' allow the user to zoom in on items of interest in individual news stories, expanding on the initial information, to bring in other related stories and material from databases. Much of this information could be in the form of sound and graphics, including video.

Although the hypernewspaper is some way in the future, programs like *Genesis* allow us to sample some of the possibilities now. *Genesis* and its cousins will have uses in areas as diverse as video production, database management, presentation graphics, education, and games. We are all going to be taking them very seriously indeed.

Fin Fahey

CARRY ON PERFECTING

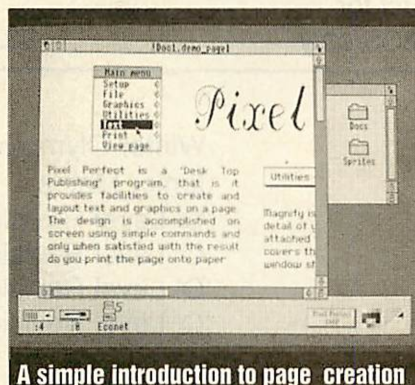
GRAHAM BELL ponders the value of budget desktop publishing with a Risc OS version of Pixel Perfect

The original *Pixel Perfect* proved a popular publishing package on the BBC micro: owing to a wide range of curricular material, add-on fonts and clip-art packs it found particular favour in schools. AVP also claimed it to be the first desktop publishing package available on the Archimedes. Now the Risc OS compatible Version 2 is here, can it stand up to the heavyweight competition?

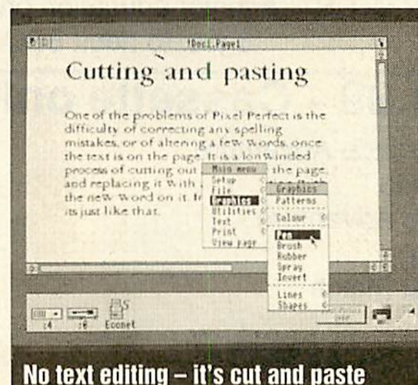
Inspecting the manual doesn't inspire confidence in the new contender. It was prepared with *Pixel Perfect* itself, and 9-pin dot-matrix output doesn't hit the mark these days. But it is clear, concise and has helpful hints picked out with a bulb icon.

Before you use the program you must copy it from the original unprotected disc to your working disc and set up a number of special directories to hold fonts, sprites, text and so on. Fortunately, the Risc OS desktop makes it easy to move files around, and there's a menu option to create the directories on a new floppy disc. Installing the program on a hard disc, however, is a little more difficult.

Clicking on the *Pixel Perfect* icon briefly displays your disc's registration number, then opens a blank window displaying part of an A4 page. It uses the Risc OS Wimp system, so it makes use of the mouse and menus and allows you to run other applications at the same time. You have to be wary, though, as the program only works in mode 12. This is one of many features which go against the Risc OS grain. There is a difference between Risc OS compatible (it will run under Risc OS) and compliant (it follows Risc OS style and methods too). *Pixel Perfect* is merely compatible.



A simple introduction to page creation



No text editing – it's cut and paste

The menu accesses the main functions: loading and saving individual pages; drawing graphics directly onto the page; importing and manipulating sprites; importing text into pre-defined frames; typing in text.

If you choose to import text, then a separate menu appears. The process requires several steps, and it's anything but obvious. – it proved beyond me without recourse to the manual. Before you read it in, you have to define a frame for it to occupy, a typeface and size, leading and so on, and you have to set these up one at a time using the menu. There's no concept of text styles, but you can import text from *View*, *Wordwise*, *First Word Plus* and from plain Ascii text files. Once the text is on the page, you can't edit it or change the style at all – it is no longer real text, but a text-shaped graphic. Even correcting a spelling mistake is a difficult process of cutting out the mistake and pasting in a correction.

You can use any of the four bit-mapped typefaces supplied with the package (serif, sans serif, twenties and 'olde English' styles), the old Arc bit-mapped fonts as supplied on the Welcome discs, and also the Archimedes' new outline font system if you have it.

The advantage of the four AVP fonts is that as well as normal text, you can type vertically as well. The Arc's own fonts can be used at any size, whereas the AVP fonts are limited to one of nine pre-set sizes.

The graphics tools are the best feature of the program – there's a comprehensive set of line, curve, airbrush, shape and cut and paste tools to draw quite intricate graphics. An on-screen grid can aid you in aligning parts of the illustration, and there's a way of zooming in to edit individual pixels in a vital detail. Sprites can be imported too, provided they were drawn in mode 12, so you have access to *Artisan* pictures, scanned photos and so on. Font and clip-art packs from the old Beeb version of *Pixel Perfect* can be used with this version too, providing you can transfer them to a 3.5in disc.

Once you've completed a page, you must save it before loading another – there is a warning if you are about to lose your work. You can also preview your page, albeit squashed down to fit the screen.

Printing is limited to Epson FX80 and LQ800 compatible printers: no use is made of the Risc OS printer drivers, though to be fair, the two supported printers are certainly the most common. Printing is commendably quick, but the printout has no more resolution than on screen. Even the 'outline' fonts are printed rather jagged, because they are turned into mode 12 graphics when you put the text on the page.

After using *Desktop Publisher* and *Impression*, and knowing the typographic and graphic standard possible with even a cheap dot-matrix printer, what you can coax out of *Pixel Perfect* is disappointing.

At heart, creating a page with *Pixel Perfect* feels like trying desktop publishing with *!Paint*. The 90 kilobytes of memory used to store each page is in reality an A4-sized mode 0 sprite. And while *Pixel Perfect* makes a fair sprite editor, with good drawing tools and the ability to import text from a wide range of wordprocessors, this is not the best way to create printed matter. Even a single page needs a heroic effort.

The page-painting approach used is a glass chin in the DTP ring. But then *Pixel Perfect* doesn't try to fight in the same league as *Impression*, *Desktop Publisher*, *Ovation* and *Tempest*.

It aims to be a simple and cheap introduction to page creation, allowing school students in particular to produce worksheets and project reports with minimal fuss. Sadly, it doesn't quite make out.

The whole point of wysiwyg is that it's easy to change what you see, so it matches what you want to get. And it isn't easy to change text once it's on the *Pixel Perfect* page. Unless you're wedded to curricular material developed for Beeb *Pixel Perfect*, the Arc version is not a sensible choice.

Pixel Perfect, *£95 + VAT for a school site licence, £60 for home use from AVP Computing, Chepstow, Gwent NP6 5ER. Tel: (02912) 5439*

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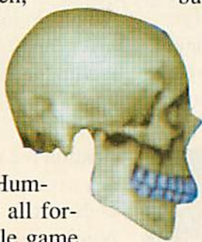
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GAME SHOW

Superior Software, in conjunction with French software company Infogrames, will soon be making available to BBC and Electron owners versions of *Sim City* and *Hostages*. Described by Superior as its highlight of the year, *Sim City* is something close to an original, new at least to the Acorn range. Players are given the task of running a city. The city must be properly planned and managed, kept clean and efficient, and pollution levels kept down.

If it gets too easy you can introduce the odd natural disaster now and then, such as tornados and earthquakes, to liven things up. Watch out for this megagame on the Beeb this summer with, hopefully, an Archimedes version not too far behind.



Also stemming from this Humberside-Lyons partnership, for all formats, is *Hostages*, an SAS-style game. A foreign embassy has captured several hostages and you must storm in, with guns blazing, and get them out alive.

The proud Archimedes owner who is observed rolling round on the floor in an uncontrolled fit of hysterics, with streaming eyes, a twisted grin, and muscle spasms to boot, might well have just heard about a new emulator for the 32-bit machine, produced by Arxe Systems. Put simply, it's called *The Speculator*, an application that quite literally allows, or rather forces, your Archimedes to run Spectrum software.

I played *Atic Atac* on it and it seems to work just as fast as a real Speccy. Apparently, special code had to be incorporated into the A3000 version to slow it down!

On the face of it this idea might well be a source of some considerable amusement, but examine the deal before pronouncing final judgement. Eventually, for a mere £20 you get the emulator plus five games on disc, which isn't bad.

Arxe has copied over 250 games onto disc, including *Knightlore, Atic Atac, Jet Set Willy, Sabre Wulf,* and *Rebel Star*, all of which will be available very cheaply. I say eventually, because Arxe needs a software house with licences to all these games to take on board the selling of the emulator. The problem is no one believes they're serious when offered it!



Look out for Blowpipe



Adventure into Wonderland this summer

Anyone into adventure games will have heard of Magnetic Scrolls, famous for programs such as *Corruption* and *Fish*. Arc owning adventure fans will be pleased to know that the first two games, *The Pawn* and *Guild of Thieves*, have now been released, completing the back catalogue. The two games are available from Inter Mediates, 2 South Block, The Maltings, Riverside Way, Sawbridgeworth, Herts, M21 9PG and cost £29.99 each.

Even better news is that Magnetic Scrolls will continue to support the Archimedes, starting off with *Wonderland*, based on the popular Lewis Carroll classics. All the characters feature in the plot, including the hookah-smoking caterpillar and the sleeping doormouse.

Having taken two years to develop, *Wonderland* runs under a completely new adventure environment called Magnetic Windows. New features include, multiple windows, icons for every object and location in the game, and automatic mapping. All the new features can be controlled by the mouse pointer.

The high standard of graphics has been enhanced with animation. In addition, pointing at parts of a picture will cause different actions to happen. Examining an object is now just a case of clicking the mouse on it.

The game promises to be huge and will therefore require at least one megabyte of


Nevryon: If it moves shoot it, if it doesn't move shoot it anyway

Nevryon

The Fourth Dimension; tel:(0747) 700661
BBC disc £14.95, Compact £15.95

As far as I know, *Nevryon* is the only *R-Type* clone to have appeared on the BBC. For those of you who haven't been into an amusement arcade in the last year, *R-Type* was the first in a very long line of sideways scrolling shoot-em-ups featuring numerous aliens and upgradeable ships. *Nevryon* goes a long way in providing this type of game.

Spread over four levels, each with two stages, you must battle your way through the alien defences with your lowly spaceship. Each level is harder than the last and comes complete with an 'end of level fortress' that must be destroyed piece by piece.

As a rule of thumb, if it moves shoot it, if it doesn't move shoot it anyway! Ground-based defences shoot laser bolts, launch fireballs or fire missiles, but can be destroyed after a number of hits. Mobile aliens, on the other hand, only take a couple.

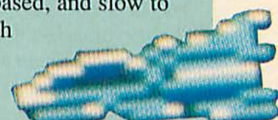
Dispatching enough aliens will release a flashing pod. Collecting this will increase your destructiveness in some way – rapid-fire lasers, a battering ram (although it does look more like a chicken that's been stuck on your ship!), a gun droid and missiles are gradually added. These final two are almost essential for annihilating the fortress.

The game can be played at three speeds (I found the fastest was easier to play) and at five skill levels (I must admit I stuck to 'Timid'!). A system of passwords is employed to start at later levels. This I certainly needed, as I got quite definitely stuck on the second stage. Losing all your energy destroys your ship and returns you, unequipped, to the start of the level, which does become rather frustrating.

The scrolling is acceptable, although rather jerky at times – but then this game is running on a Beeb! Good use of mode 5 colours is made with plenty of nice 'metallic' and 'organic' effects.

The only problem with the graphics (apart from the chicken!) is the laser bolts – the only difference between yours and the enemies' is colour, which does become a trifle confusing at times.

The game is disc-based, and slow to reset at the end of each game. I would like to have seen a sideways Ram caching system.



To sum up, a very good Beeb game that will keep you occupied a good number of evenings. The Arc version is due in May.

David Lawrence

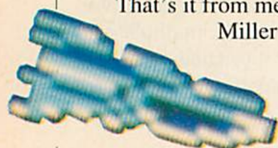
memory to run in. At last the perfect excuse to upgrade all those old 305's! *Wonderland* will be available in the late summer from Virgin. Watch these pages for more info.

Another Arc game that's almost ready to play is horizontal scroller *Blowpipe* from newcomers Riscy Business. The preview copy in the *Quazer/Alerion* tradition showed promise, and with a few improvements should be worth looking out for.

Briefly, Superior's highly acclaimed *Speech!* for the BBC, allowing your micro to talk without additional hardware, is being written for the Archimedes.

It will be on sale at around £15 and should be out in the summer.

That's it from me for two months. Rob Miller will be giving you the low down on all that's new next time.



Sam Greenhill

Fireball II

Cambridge International Software; tel:071-833 4023 Archimedes £24.95

Playing *Fireball II* is like rediscovering your favourite toy which you thought had been thrown out years ago. As the name implies,


Fireball: Guaranteed to be a hit

Fireball II is the direct descendent of *Fireball I*, the first Arc *Breakout* clone in 1988. In case you'd forgotten that, *Fireball I* is included free on the disc.

Just like its predecessor you have to hit the bricks using a bat and ball. Boring, right? Wrong. When I played this game I didn't have time to be bored because I was too busy dodging bombs and aiming lasers among other things. There are about six different types of 'special' brick, each with its own nasty characteristic. Some drop lethal bombs when struck, others disappear then reappear five seconds later.

They are coloured (or not if they are invisible) and textured differently, so identification is easy. Also falling at random from any assaulted bricks are little capsules which endow the bat with special powers like bomb protection or lasers. There are loads of screens, increasing in difficulty as you progress.

By far the best feature of this game is the screen editor. This allows you to create your own screens using a cursor and the different types of brick, which is great fun. Also, using the editor you can rearrange the screens, putting the difficult ones first so you don't have to go through the tediousness of clearing the easiest.

The graphics are adequate, if a bit quaint, and there's definitely nothing flash here. The only gripe on this front is that whenever the screen is cleared the sides roll in, then out again revealing the new screen. Very nice for the first hour, but you'll be cursing it soon after that.

The sound is one aspect which I have mixed feelings about. On one hand you have some excellent sampling, really good, and on the other you've got some annoying music.

This is the kind of game that anyone can play, guaranteed to be a hit with even non-computer crazy friends.

Andreas Englezou

Apocalypse

The Fourth Dimension; tel:(0742) 700661
Archimedes £29.95

This is the game that's been talked about before as *Liberator*. Since then, however, the miraculous new 3D plotting routine has been abandoned (or at least postponed) along with the name. But that is all history – the present is rather better.

I should say the future really, because my version lacks about 97 per cent of the map – but the three per cent left is something! You view the world from within a space ship, like *Elite* or *UIM*, and can fly about between towns on the surface of a rather vulgar green planet.

Nasties shoot green photons at you, and you shoot yellow ones back. The firing aspect looks very nice on screen, since your photons start very big when they're close to you – much better than a stream of white pixels. The explosions are also a treat – nice and big with great volumes of smoke.

For some reason your ship travels faster backwards than it does forwards, and as a result the computer automatically takes up your altitude to avoid hitting buildings.

Helicopters hover protectively over some towns, and mushrooms grow outside others, five 'mega-photons' being awarded for every dead mushroom.

The scrolling is very smooth, and the action does not appear to slow down in crowded situations.

Your flying saucer (makes you sound like a green Martian!) is able to drive along the ground but there is no noticeable difference between this and flying. Flying backwards is fun as well as useful.

You can charge into a hostile town, with a fully charged photon-laser, hold down the fire button and when things get too hot slam down the reverse key. This is good because as I mentioned you are taken up as well – avoiding the green photons.

I won't mention the bugs now because I only have a preview copy, and I'm assured that they'll all be remedied in the final version. Of course if they're not, you can be sure to hear of them in the full review!

But as it stands, *Apocalypse* is full of promise. Gordon Key, who also wrote *E-Type* and *Holed Out* looks set to be third time lucky, having already been first and second as well! By the time you read this, *Apocalypse* should already be available.

Sam Greenhill



New in the shops is Apocalypse – it's full of promise

Pipemania

Empire Software; tel: (0268) 541126
BBC/Master cassette £9.99, disc £14.99

Pipemania is a game in a genre of its own. I expect some people will make an unjustified comparison with *Confusion* (if they can remember that far back), purely because of a slight graphical similarity, but this game is truly original and a refreshing change at that.

This is one of those deceptively simple-looking yet fiendishly addictive games that will hold your interest far longer than the average mindless shoot 'em up. Gameplay consists of trying to arrange a series of blocks containing different shapes and lengths of piping, to provide a convoluted passageway for a strange liquid which insidiously begins to creep along it.

After a while the liquid draws ever closer to the end of the pipe, you are running out of room on the board, the music reaches fever pitch and it all becomes too much! Progressing through the 35 or so levels, the available pieces become more varied.

This arranges 'one-way' pipes around 'bottleneck' types which the liquid takes a while to fill, providing a temporary reprieve for the poor player. Surprisingly intricate networks can be constructed which loop, twist and can even go off the edge of the screen to reappear on the other side.

Pipemania combines all the best elements of several games. For example, on the bonus levels, the player (or players – two can play co-operatively) have to construct the usual passageway by dropping the pieces one by one into the playing area, in a style reminiscent of *Tetris*.

This is more difficult than it sounds, so I chickened out and used one of the (manifold) cheat modes, which will doubtless be revealed to all of you lesser mortals at a later date.

Other features such as password entry to levels, the one or two player option, a choice of keyboard or joystick control and a slower training speed for the less nimble-fingered add up to make this an outstanding piece of work.

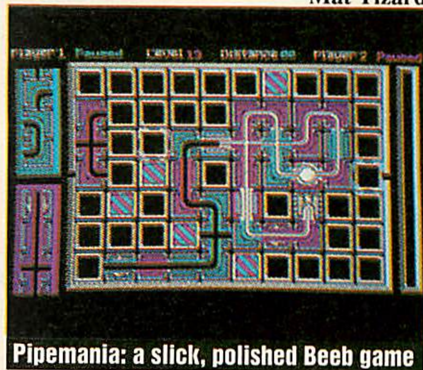
Those of you who have marvelled at the names in the high-score table of *Repton Infinity*, will be pleased to note that the author of both these games has produced some more of them. (Seth Maori, or Patty Euroclown for example!)

This game has existed in one form or another for some months now, but has had to be rewritten no less than three times, certainly not through lack of skill, but because of the publisher changing hands.

As you can imagine, starting more or less from scratch three times has resulted in a slick and polished final product, without which anyone's collection is incomplete.

An Archimedes version is in the pipeline (sorry, I couldn't resist that one!) which is considerably smoother, more colourful, and far more graphically varied, with marbling-shade effects among the improvements. This is only a few weeks away, and will be well worth the wait.

Mat Tizard



Pipemania: a slick, polished Beeb game

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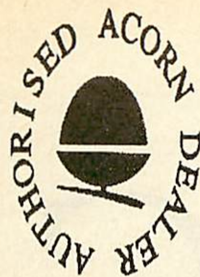
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MAKING NEWS


The hustle and bustle of a busy newsroom comes to life for these youngsters

DAVE FUTCHER investigates Teletype, the newsroom simulator that gives children a chance to experience the thrill of reacting to 'live' news

It looks like a normal classroom, with 30 children working in groups of five and six. The children are totally engrossed. Then suddenly the sound of the teleprinter breaks the gentle hum of these minds hard at work. Someone from each group rushes to the door, where the printer spews out pieces of undigested news.

The pieces are grabbed on the run and the latest information from correspondents around the world is brought back to the news desks. The groups at work raise their level of frenzy another degree.

Moments pass... The teleprinter screams across the paper once again and the runners fly back to the door.

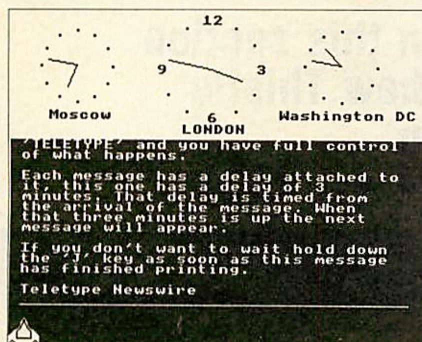
Back in their groups the children are thinking aloud, questioning each other, and questioning themselves.

Bits of paper are being shuffled and reshuffled. Some papers are tossed on the floor with little more than a cursory nod.

The children are absorbed, they are interacting with each other and working furiously against the clock.

This class is working on a newsroom simulation. Everything is taken from pieces of news that have 'come over' a BBC micro that's become a simulated teleprinter.

It's an amazing shift away from the chalk and talk methods of teaching into the modern-day realms of high technology – putting the I into IT, you might say.



Full-blown news

Teletype is a package developed by Marshall Anderson and Sherston Software that offers schools a chance to run a full-blown news service simulation.

It's a package that can be used in lots of different ways. As well as offering the full excitement of a newswire service to the classroom, it can be used to provide experiences for children to re-live historical events, or simulate incident rooms.

It does not have to be confined to work in English as Sherston has already released foreign add-ons for French and German. These will certainly pep up modern language work in secondary schools.

One of the beauties of *Teletype* is the large number of demonstration files that accompany the package. They have been written by teachers and offer a whole range of different approaches.

A couple of hard news stories called 'Aliens' and 'Hele' provide just the right sort of starting point for a school newsroom simulation. Aliens is about an alien landing in London and around the world. This ends with a news blackout.

Hele is a story which is based on factual events about the attempts by a Libyan airline pilot to defect via a group of British tourists.

With Aliens and Hele the children can behave just like real reporters and watch the news arriving minute by minute, with the events unfolding as they would in a real newsroom.

'Police' is an ideal file for first-time users of *Teletype* . It consists of a simple story of a theft in Wales.

At a far more involved level is a file called 'Crime', which could form the basis of an incident room simulation.

It opens up the possibilities of the children conducting interviews, taking statements, applying for search warrants and writing up their findings in the rather terse prose used by the police.

This *Teletype* file is linked into a *Grass* database file included on the disc, which contains 103 criminal records.

Two sample files are provided to show the historical potential of *Teletype.* They are 'Fire1' and 'Fire2'. The first starts with the outbreak of the Great Fire of London at 1.30am on 2nd September 1666, then covers the progress of the fire throughout the City and the attempts to put it out.

Fire2 contains further details of the panic that set in and the unpleasant behaviour of some people.

There are also two files aimed at older infants. 'Tarts' tells the story of the well-known theft at the palace. 'Pigs' is about three little pigs that build a housing estate and see off the wolf.

Probably, however, the most memorable and completely different *Teletype* file is one called 'Macbeth'. It has been carefully assembled so as not to frighten children off Shakespeare.

Doing it yourself

Despite all these super ready-made files, the power of *Teletype* lies in it being content-free. As well as running the demonstration files it provides all the tools anyone could need to create their own newsroom simulation.

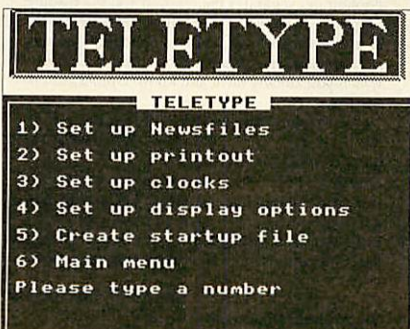
The package is made up of two main programs. The Newsfile Creator is a simple wordprocessor tool which is used to write the stories, or newsfiles. *Teletype* proper simply prints newsfiles out, either on screen or paper.

Teletype also allows the teacher to run more than one Newsfile at once. This adds to the newsroom atmosphere and reality – noise files can be used to interrupt the main thread of the story coming over on the teletype machine.

Teletype allows up to five newsfiles to be run at one time so several different stories plus a noise file can provide a full-blown newsroom.

With more than one newsfile selected, the program counts the number of messages in each file and then chooses randomly, but with the odds in favour of the biggest file, where it gets its next message from.

To add to the realism *Teletype* can display



up to three clock faces at the top of the screen so that the time in three time zones can be linked to the news coming in.

If *Teletype* is being used for group work it will also send a number of copies of each message to your printer so that the program can serve several groups of children.

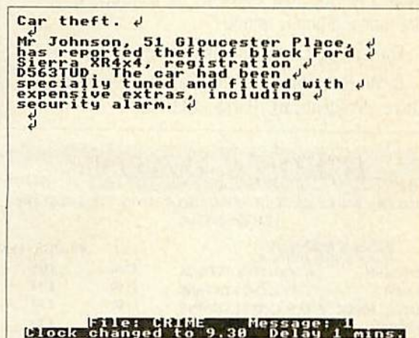
Creating newsfiles

Creating your own files with the Newsfile Creator is quite simple. Sherston has provided a customised wordprocessor to do all the work.

Once the option is selected you are asked to give the file a name and to reserve space on the disc for the file. Then it's just a question of typing in each of the messages in the newsfile.

After each message has been typed, the delay period has to be set. This is the amount of time that *Teletype* will wait after the current message begins printing. This is done by pressing a function key and making choices from a menu.

A very clear function key strip is provided with words and symbols to help ease of use. The f1 key is used for setting timings, and once the delay has been set you have to press ESCAPE and return to the word-processor screen. Then the message has to be saved by using f2 which brings up the



Disc Filing Menu and the Save This Message option is chosen.

You don't have to rely on the Newsfile Creator, although I suggest you do. Sherston has allowed for newsfiles to be created on your own wordprocessor. This is achieved by *Teletype* having an option for converting wordprocessed files into files that can be used by *Teletype*

The manual tells you how to use *Interword* , *Wordwise Plus* and *View* . It should be possible to convert most text although a few guidelines should be followed such as setting line length to 34 characters, messages should be 27 lines or less and each message must be preceded by seven pad characters which can either be £ or @.

Another really useful utility converts *Extra* files. Those schools who have been using the Shropshire public domain newsdesk program *Extra* can move up to the power of *Teletype* .

Teletype *costs £26. French and German file discs are also available at £12.50 each. The package may be obtained from Sherston Software, Swan Barton, Sherstone, Malmesbury, Wiltshire, SN16 0LH (Tel: (0666) 840433).*

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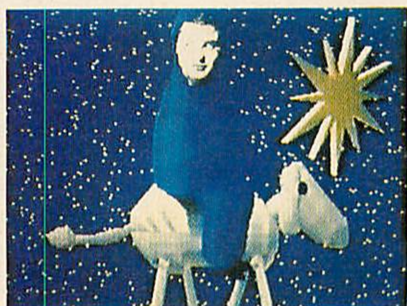
TOP OF THE POPS

CHRISTINA NEAL finds out how the A3000 and Arc make videos

Producing pop videos is not only glamorous, for Miles Visnam and Robert Pepperell it's the perfect way to make a living out of their two favourite pastimes – computers and art. These former art students decided to combine their love of computer programming and artistic images by producing computer-animated videos. Equipped with an Archimedes 310, an Apple Mac and an Amiga, they formed the roots of their own company.

After a period experimenting with the setup in their South London flat, Hardwire saw the light of day. This led to the pair producing videos for promising young acts such as Coldcut, Yazz, Gaye Bykers On Acid and Mark E Smith of The Fall.

With each video containing an interesting and sometimes puzzling collection of visual images (Coldcut's Christmas Break boasted a cheerful array of cartoon Santas!) the production process is a complex task.





Miles and Robert start by filming the artists in action and editing the film in a hired video suite. When this is done, the computers are used to add the artistic images, putting the final touches to the filmed material. Miles explains;

'Each machine contains a video card to convert the RGB output of the computers into a PAL video signal. Once they are encoded into a PAL video signal, we use a video mixer in edit suite format'.

Initially, this was done with the help of an Archimedes 310 but Miles and Robert changed to the BBC A3000 shortly after its launch last year.

'Although the other two machines are useful for looking at software containing various images, the A3000 generates the bulk of the images used in videos,' says Miles. 'It also enables us to include 2-D background images'.

'The Archimedes can interact with real time and create fast results. At the moment, we have to go through all the artistic material, but we'd prefer to have random access'.

So far, the pair have managed to gain most of their business through word of mouth. As their reputation grows, their workload is also increasing. Even as we speak, Robert receives a promising call from a record company rep about a possible future assignment. 'Record companies tend to approach artists whose videos they've seen and ask them who was behind it', he says. 'We're usually asked to prepare a synopsis and if they like our ideas, we're called in for a chat so that we can work out a budget'.

'We're really glad to be recommended because when we first started out, we didn't have any work for a long time and ended up doing all kinds of grotty jobs! But we managed to build up various contacts and the work stemmed from there'.

However, there are certain types of videos that Miles and Robert prefer to avoid. Anyone with firm, pre-conceived ideas about their video may not tie in with their spontaniety. 'We've been asked to do videos involving storylines or themes with girls wearing short skirts', says Robert. 'That's not really our niche. We did Coldcut's video because the artists were much more interested in the music they produce and were prepared to take risks'.

'People who won't take risks aren't suitable for us', says Miles. 'All our videos have been experiments and we're always looking for new things to try out. '

At the moment, they are putting the finishing touches to a video to accompany the new Coldcut album. When this is completed, they plan to assemble a collection of artistic images for a Channel Four art-based programme called *Buzz* . As mentioned in our April issue, contributions from *BAU* readers are very welcome.

'We want to put together lots of public domain software for a five minute section in the programme on computer-generated images', says Robert.

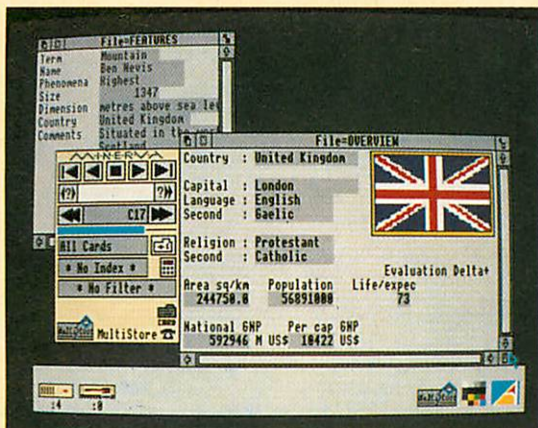
'We're looking for good graphics and interesting pictures, but not necessarily something created by a technical genius. The fact that something is more interesting to watch is far more important than how difficult it was to do'.

The programme is expected to be screened towards the end of June, so contributors should send in their 3.5inch Archimedes-compatible discs as soon as possible. In the meantime, Hardwire plans to develop the role of its computers.

'We'd like to set up the computers to run as a network so that we can create 3-D images which might react with 3-D animation on the Archimedes.

'We really want to get the most out of our machines. We'd like to think that, in the future, we can continue to produce exciting visual material to a very high standard with artists who share our interest of art and new technology'.

Send your contributions for *Buzz* to Hardwire, 5 Cumbria Road, London SE5.



MULTISTORE

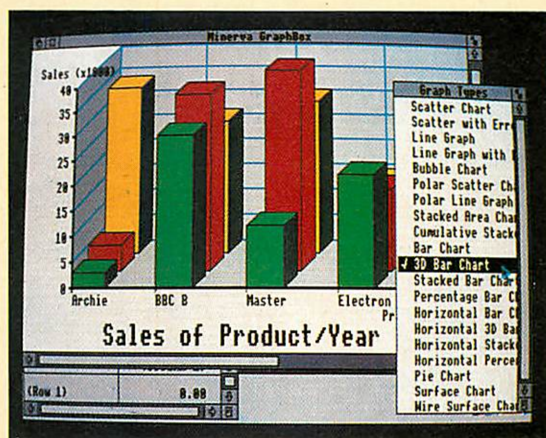
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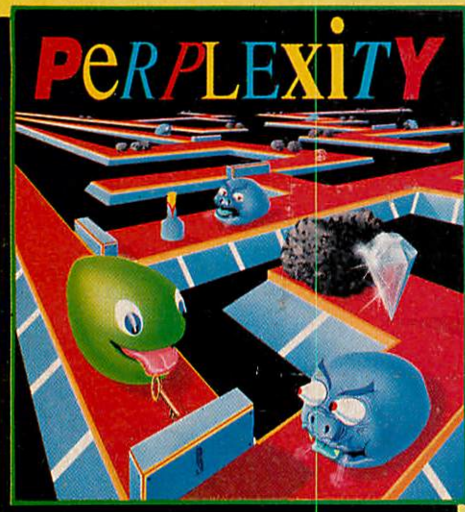




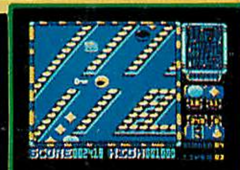
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But watch out for the monsters who will chase you around the maze. And watch out also for the 'mystery boulders', which may give you a bonus score or a magic potion, but may also reverse some or all of the movement controls...then you've really got problems!

On-screen information includes a constantly up-dating scanner/map, which allows you to plan your route, a score-line and timer/status icons. Passwords allow you to skip completed levels.

PERPLEXITY combines the best puzzling features of REPTON games with superb 3D graphics, to give a highly addictive and visually brilliant game. Are you ready to face the challenge?

(The Electron version has the same graphics as the BBC Micro version.)

PLAY IT AGAIN SAM 13
A New Top-Hit Four-Game Compilation

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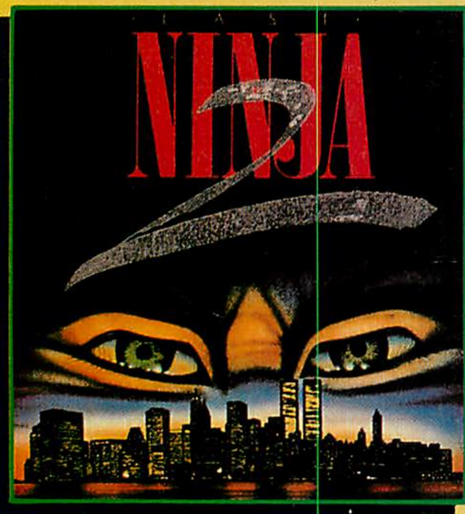
"Eighty screens of fun make this game my favourite"....Micro User



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(The screen pictures show the BBC Micro versions of the games.)



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